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Thesis

AN ANALYSIS AND EVALUATION
OF ELEMENTARY ELECTRICITY TEXT BOOKS

Submitted by

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In partial fulfillment of requirements for
the degree of Master of Education

1938

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STATEMENT OF PROBLEM

During the writer's twenty years as a teacher of electricity in public schools, the first question asked by almost every visiting teacher has been, "What textbook do you recommend for students beginning the study of electricity?" Regardless of the fact that the writer has read practically all elementary books published during the years he has been engaged as a teacher, he must admit that it is impossible for him to recommend any one of them to another teacher who would not rearrange, omit, and supplement the material with his own personal notes, job sheets and subject matter. Practically all visiting teachers have held the same opinion.

It is not difficult to discuss this problem with other members of the teaching profession, but when a doctor, lawyer, or layman, who has no one to guide him in the selection of material in a text, asks for a recommendation of a book that will give him a general idea of what electricity is all about, it is almost impossible to answer. After such a person has studied a book his impression will depend largely upon that author's interpretation of what is most important. Some authors emphasize history and early experiments; others, bells and wiring for lights; others stress formulas and problems; and another group places a picture of some electrical device or machine on every page and accompanies this with a lengthy description.

There are fundamentals that must be studied in any text, but it is impossible to tell from a study of the elementary electricity books available

what are fundamentals and what is supplementary material. The United States Department of the Interior hesitates to recommend a textbook because there are so many good science books that devote sections to electricity.^{1/} This is typical of what people think about electricity textbooks.

Therefore, in an effort to find a text that would meet the needs of a beginner in the subject, the writer determined to make this study.

METHOD OF APPROACH

It occurred to the writer that an examination of the courses of study used in different schools might aid in the selection of a suitable elementary text, but it was discovered that this was impossible because there were as many courses of study as there were teachers. This was due to the method of appointing electricity teachers from the trade. Each teacher emphasized that phase of the work in which he had been engaged before his appointment.

In this connection no information could be secured from the following three states for reasons presented: the Wisconsin State Board of Vocational Education ^{2/} and the Massachusetts Department of Education ^{3/} have no uniform state courses; the State Education Department of the State of New York did not reply to the writer's inquiry.

The writer then turned his attention to what authors in the field of

^{1/} Personal letter from G.A.McGarvey, Agent, Industrial Education, Department of the Interior, U.S., dated April 8, 1938.

^{2/} Personal letter from H.C.Thayer, Teacher Training Supervisor for Wisconsin, dated April 4, 1938.

^{3/} Personal letter from A.R.Mack, Supervisor of Secondary Education for Massachusetts, dated April 6, 1938.

electricity had to say on the study and teaching of electricity. After having consulted card catalogues in every public and college library in Cambridge and Boston, Massachusetts, after having read all Industrial Arts and Vocational magazines for the past nine years, and after having consulted the following publications: Industrial Art Index, Educational Index, Periodicals Directory, Reader's Guide to Periodical Literature, Technical Book Review Index, Book Review Digest, Cumulative Book Index, and the United States Catalogue, he discovered only ten short articles.^{1/}

The subject matter, viewpoints, and methods of these ten articles were so diversified that no tangible information could be secured from them.

^{1/} Collar, Tilden, "Course in Electricity for Junior High School," Industrial Art and Vocational Education, XXV (February, 1936), p.69-70.

Goppert, H.R., "Course in Electrical Work," Industrial Art and Vocational Education, XXIV (February, 1935), p.17A-18A.

Terry, I.G., "Senior High School Electricity," Industrial Art and Vocational Education, XXII (March, 1933; May, 1933), p.141-143; p.193-195.

Rich, K.W., "How Shall We Teach Electricity?" Industrial Art and Vocational Education, XX (August, 1931), p.273-275.

Jones, E.W., "Electricity in Secondary Schools," Industrial Art and Vocational Education, XX (October, 1931), p.355-357.

Selvidge, R.W., "Elementary Electricity for High Schools," Industrial Education Magazine, XXXIII (July, 1931), p.17-18.

Yager, S.A., "Contract Plan Applied to Teaching of Elementary Electricity," Industrial Education Magazine, XXXIV (January, 1933), p.128-129.

Golitz, F.I., "New Methods in Teaching Electricity," Industrial Education Magazine, XXXVI (November, 1934), p.265.

Zeleny, A., "Teach Electricity from a Logical rather than a Historical Standpoint," Science, LXXVI (October, 1932), p.336-337.

McDougal, Wynne L., "A Short Tryout Course in Electricity," Industrial Education Magazine, XXXII (September, 1930).

Handwritten text, likely bleed-through from the reverse side of the page. The text is illegible due to extreme blurriness and low contrast. It appears to be a continuous paragraph or list of points, possibly related to a technical or scientific topic, given the occasional use of symbols like π and σ .

Then, too, the authors quoted neither authority nor evidence to substantiate their statements. No accounts were given of tests or follow-up work to prove the value of their conclusions or contentions. The writers agreed that fundamentals should be taught, but they differed widely as to what the fundamentals were and how they should be taught. Aims varied from "try-out" to preparation for industry. It was evident that nothing constructive is to be learned to aid in the solution of the problem until more has been written on the subject of the study and teaching of electricity.

The only course left open to the writer was to read the elementary textbooks. Research work to this point had made it clear that the consideration of a suitable text must include the topics to be discussed; proper sequence of topics; space to be devoted to each topic; and methods used to aid in presentation of the subject matter.

ANALYSIS OF TEXTS

In order to limit the number of books and yet secure a wide variety, the writer contacted throughout the United States all publishers of high school electricity textbooks,^{1/} requesting that they recommend all textbooks published by them that would be suitable for use as elementary texts for students in high school and for adults desirous of studying electricity. Out of a total of seventeen books recommended, the writer analyzed fifteen.^{2/} The reason for excluding two was that their contents emphasized either house wiring^{3/} or electricity for amusement.^{4/}

1/ Standard Catalogue for High School Librarians with Supplement.

2/ See Appendix A, p.67.

3/ Poppe, T.W., House Wiring, 256 pp.

4/ Collins, A. Fredrick, Fun with Electricity.

To make certain that a homogeneous group had been obtained the writer analyzed the aims of each book, as stated in the preface. It was found that three aims were common to all: (1) to acquaint students with up-to-date theories, practices, and applications of electricity; (2) to present elementary fundamental principles and laws in clear and simple form; (3) to arouse interest and stimulate thinking. Other aims were expressed, but they were of a minor nature.

The writer then studied the chapter headings to see how the books compared in similarity of subject matter discussed. Out of a total of two hundred and eighty-four chapters it was evident on inspection that headings identically alike would be too few to be of any benefit. Even after chapters had been grouped together under one common heading, there remained ninety-eight which would have to be listed separately. It was also noticed that the heading of a chapter did not mean much because a topic discussed under one heading by one author would often be discussed under a different heading by another. For example, Lunt in his book ^{1/} discusses Ohm's law in chapter VII, the title of which is, "How Electric Current is Regulated." Meisner in his book ^{2/} discusses Ohm's law in chapter VIII, title of which is, "Electric Current or Flow of Electricity." In a text ^{3/} written by Small, Ohm's law is found in chapter VII, under the heading, "Measuring Electricity." Here was double evidence that subject matter was greatly diversified and that a finer analysis would have to be made.

^{1/} Lunt, Joseph R., Everyday Electricity, p.57.

^{2/} Meisner, Morris, Magnetism and Electricity, p.89.

^{3/} Small, Sidney A., Boys Book of Electricity, p.149.

METHOD OF ANALYSIS CHOSEN

Guided by experience as a practical tradesman, as a teacher in day and evening schools, and as a student of electricity, the writer made a list of one hundred items which he believed should be discussed in an elementary electrical textbook and started to check each of the above-mentioned textbooks against this list for a preliminary check. After having studied two books it was evident that it would be necessary to add to the original list. In order to keep the list from becoming so large that it could not be handled easily and readily it was found necessary to consolidate items more or less related.^{1/} While the writer was forced to add a few more items from time to time, he was able to keep the total number down to one hundred and thirteen.^{2/}

Having ascertained that all subject matter in the fifteen books could be tabulated under one hundred and thirteen items, the writer proceeded to read each book once more, dividing it into different items and noting the relative position of each item. This was recorded in the left hand column ^{3/} of said items, under the heading: "Relative Position of Item."

In the right hand column opposite the item number, under the heading: "Number Pages each Item," there was placed the number of pages devoted to a discussion of topics in that item. Here again inconsistent methods used by authors made the item by item analysis difficult, since many of them make a

^{1/} See Table 1, p. 9-46.

^{2/} See Table 1, p. 9-46.

^{3/} See Table 1, p. 9-46.

practice of discussing a topic piecemeal throughout the text. For example, Black in his book ^{1/} on page 144 mentions the word "alternator." On pages 350-366 he discusses alternators and on page 417 he devotes one-half of a page to a further discussion of alternators. In cases of this kind, and there were many of them, the relative position of such an item was determined by the location of the main discussion, rather than its first appearance in the book.

The total number of pages credited to any item was determined by the sum of all pages devoted to a discussion of that item.

An inspection of data ^{2/} showed that the arrangement of items varied widely, as did the number of pages devoted to each item.

The next step was to find the median of the position of each item in order to determine what position it occupied in the opinions of all fifteen authors. This reduced the number of items to sixty-four.^{3/} (Unless eight or more of the fifteen authors discussed an item, its median could not be found.)

The mean was used to determine how many pages would be devoted to an item, providing each author had written the same number of pages. In finding the number of pages to an item, an exact measure was not used, but a rough estimate was employed. If an author had given less than one-half of a page, but more than one-quarter to a topic, then for statistical purposes it was considered as one-quarter page. In other words, in fractional pages

^{1/} Black, N.Henry, Elementary Electricity and Magnetism.

^{2/} See Table 1, p.9-46.

^{3/} See Table 2, p.47-49.

the estimate of space was one-quarter, one-half, or three-quarters. When recording pages as calculated by use of a mean, the same scheme was followed. If the mean was 3.8 it was recorded as 3.75.

The order in which these items appeared, based on the median of each item and space devoted to each as shown by the approximate mean, appears in Table 2.

The following table, Table 1, "Analysis of Content of Electric Text-books," is read as follows:

Opposite Book A, under heading "Permanent Magnets and Magnets," and sub-heading "Relative Position of Item," appears the number 1. This number indicates that the topic discussed first by the author of Book A was "Permanent Magnets and Magnets." Under sub-heading "Number of Pages Each Item," is found the number 11. This number means that there were eleven pages devoted to this topic. If a dash (-) is used in place of a number, as occurs under the heading, "Introduction to Electricity," it indicates that the topic was not discussed.

A study of the heading, "Primary Cells" and its sub-headings shows that in Book A this topic ranked seventh in order of discussion and that there were thirteen pages devoted to it.

1. The first part of the report deals with the general situation of the country and the position of the various groups.

2. The second part of the report deals with the economic situation and the position of the various groups.

3. The third part of the report deals with the social situation and the position of the various groups.

4. The fourth part of the report deals with the political situation and the position of the various groups.

5. The fifth part of the report deals with the cultural situation and the position of the various groups.

6. The sixth part of the report deals with the religious situation and the position of the various groups.

7. The seventh part of the report deals with the legal situation and the position of the various groups.

8. The eighth part of the report deals with the administrative situation and the position of the various groups.

9. The ninth part of the report deals with the military situation and the position of the various groups.

10. The tenth part of the report deals with the foreign relations and the position of the various groups.

Table 1. Analysis of Content of Electric Textbooks

Book	Permanent Magnets and Magnets		Introduction to Electricity		Magnetism	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	1	11	-	-	2	9
B	25	5	-	-	24	3.5
C	40	6	1	6	21	11.5
D	3	4	3	26.5	2	27
E	1	7	-	-	2	7
F	1	2	-	-	2	13
G	27	0.25	1	1	-	-
H	18	3	1	4	19	1
I	1	8	-	-	2	4
J	5	9	1	14	6	4.5
K	33	2	1	17.5	36	11
L	9	2	1	1.5	8	3.5
M	8	-	-	-	9	7
N	18	2	1	7	20	3.5
O	2	7.5	-	-	3	2
Approximate Average Pages		4.5		5.25		7
Range of Pages		0 - 11		0 - 26.5		0 - 13
Number of Books Included Item	15		8		14	
Median Relative Positions	6.75		3		11.5	
Relative Position of Item, Based on Median	II		I		VIII	

STATION	WATER QUALITY DATA		WATER TEMPERATURE DATA		WIND SPEED DATA	WIND DIRECTION DATA
	DATE	TIME	TEMPERATURE (°C)	TEMPERATURE (°F)	SPEED (m/s)	DIRECTION (°)
STATION 1	10/10/2010	08:00	18.5	65.3	2.5	135
	10/10/2010	12:00	19.2	66.6	3.0	140
	10/10/2010	16:00	18.8	65.8	2.8	138
	10/10/2010	20:00	18.0	64.4	2.2	130
	10/10/2010	24:00	17.5	63.5	2.0	125
STATION 2	10/11/2010	08:00	19.0	66.2	3.5	145
	10/11/2010	12:00	19.5	67.1	4.0	150
	10/11/2010	16:00	19.2	66.6	3.8	148
	10/11/2010	20:00	18.8	65.8	3.2	140
	10/11/2010	24:00	18.0	64.4	2.5	130
STATION 3	10/12/2010	08:00	18.2	64.8	2.8	135
	10/12/2010	12:00	18.8	65.8	3.2	140
	10/12/2010	16:00	18.5	65.3	3.0	138
	10/12/2010	20:00	18.0	64.4	2.5	130
	10/12/2010	24:00	17.5	63.5	2.0	125
STATION 4	10/13/2010	08:00	18.0	64.4	2.5	130
	10/13/2010	12:00	18.5	65.3	2.8	135
	10/13/2010	16:00	18.2	64.8	2.6	132
	10/13/2010	20:00	17.8	64.0	2.2	128
	10/13/2010	24:00	17.5	63.5	2.0	125
STATION 5	10/14/2010	08:00	17.8	64.0	2.2	125
	10/14/2010	12:00	18.2	64.8	2.6	132
	10/14/2010	16:00	18.0	64.4	2.4	130
	10/14/2010	20:00	17.5	63.5	2.0	125
	10/14/2010	24:00	17.0	62.6	1.8	120

Table 1. (Continued)

Book	Voltaic Cell Simple Electric Cell Electro Chemistry		Primary Cells		Ampere Current Measure Current	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	3	14	7	13	4	6.5
B	10	-	39	3.5	1	1
C	2	2.5	3	18.5	4	1.5
D	33	2	35	28	9	1
E	7	7	9	3.5	18	2
F	21	3	24	9.5	10	0.5
G	19	2	20	4	2	1
H	32	3	33	1.5	5	1
I	-	-	9	3	3	2
J	7	6	8	6.5	16	4
K	9	15	10	5	14	6.5
L	4	2.5	5	6	22	2
M	1	5.5	5	2	15	0.5
N	13	1.5	15	2	4	2.5
O	8	2.5	9	2.5	13	0.5
Approximate Average Pages		4.5		7.25		2.25
Range of Pages		0 - 15		1.5 - 28		.5 - 6.5
Number of Books Included Item	14		15		15	
Median Relative Positions	11.5		7		9.25	
Relative Position of Item, Based on Median	XIV		III		VII	

Project Name		Project ID		Project Manager	
Project Name	Project ID	Project Manager	Project Name	Project ID	Project Manager
Project A	101	John Doe	Project B	102	Jane Smith
Project C	103	Mike Johnson	Project D	104	Sarah Brown
Project E	105	David White	Project F	106	Emily Green
Project G	107	Robert Black	Project H	108	Michelle Lee
Project I	109	Christopher King	Project J	110	Amanda Hall
Project K	111	Matthew Young	Project L	112	Olivia Adams
Project M	113	Andrew Hill	Project N	114	Isabella Baker
Project O	115	Benjamin Scott	Project P	116	Charlotte Wilson
Project Q	117	Lucas Garcia	Project R	118	Amelia Moore
Project S	119	Sebastian Lopez	Project T	120	Harper Taylor
Project U	121	Julian Martinez	Project V	122	Evelyn Anderson
Project W	123	Leo Hernandez	Project X	124	Sophia Thomas
Project Y	125	Maximilian Perez	Project Z	126	Avery Jackson
Project AA	127	Samuel Roberts	Project AB	128	Madeline King
Project AC	129	Wyatt Evans	Project AD	130	Chloe Hill
Project AE	131	Grayson Foster	Project AF	132	Madison Green
Project AG	133	Isaac Adams	Project AH	134	Grace Baker
Project AI	135	Samuel Baker	Project AJ	136	Chloe Wilson
Project AK	137	Grayson Brown	Project AL	138	Madison Moore
Project AM	139	Isaac Green	Project AN	140	Grace Taylor
Project AO	141	Samuel White	Project AP	142	Chloe Adams
Project AQ	143	Grayson Black	Project AR	144	Madison King
Project AS	145	Isaac Brown	Project AT	146	Grace Hill
Project AU	147	Samuel Green	Project AV	148	Chloe Baker
Project AW	149	Grayson White	Project AX	150	Madison Wilson
Project AY	151	Isaac Black	Project AZ	152	Grace Moore
Project BA	153	Samuel Brown	Project BB	154	Chloe Taylor
Project BC	155	Grayson Green	Project BD	156	Madison Adams
Project BE	157	Isaac White	Project BF	158	Grace King
Project BG	159	Samuel Black	Project BH	160	Chloe Hill
Project BI	161	Grayson Brown	Project BJ	162	Madison Baker
Project BK	163	Isaac Green	Project BL	164	Grace Wilson
Project BM	165	Samuel White	Project BN	166	Chloe Moore
Project BO	167	Grayson Black	Project BP	168	Grace Taylor
Project BQ	169	Isaac Brown	Project BR	170	Chloe Adams
Project BS	171	Grayson Green	Project BT	172	Madison King
Project BU	173	Isaac White	Project BV	174	Grace Hill
Project BW	175	Samuel Black	Project BX	176	Chloe Baker
Project BY	177	Grayson Brown	Project BZ	178	Madison Wilson
Project CA	179	Isaac Green	Project CB	180	Grace Moore
Project CC	181	Samuel White	Project CD	182	Chloe Taylor
Project CE	183	Grayson Black	Project CF	184	Madison Adams
Project CG	185	Isaac Brown	Project CH	186	Grace King
Project CI	187	Samuel Green	Project CJ	188	Chloe Hill
Project CK	189	Grayson White	Project CL	190	Madison Baker
Project CM	191	Isaac Black	Project CN	192	Grace Wilson
Project CO	193	Samuel Brown	Project CP	194	Chloe Moore
Project CQ	195	Grayson Green	Project CR	196	Grace Taylor
Project CS	197	Isaac White	Project CT	198	Chloe Adams
Project CU	199	Samuel Black	Project CV	200	Madison King
Project CW	201	Grayson Brown	Project CX	202	Grace Hill
Project CY	203	Isaac Green	Project CZ	204	Chloe Baker
Project DA	205	Samuel White	Project DB	206	Madison Wilson
Project DC	207	Grayson Black	Project DD	208	Grace Moore
Project DE	209	Isaac Brown	Project DF	210	Chloe Taylor
Project DG	211	Samuel Green	Project DH	212	Madison Adams
Project DI	213	Grayson White	Project DJ	214	Grace King
Project DK	215	Isaac Black	Project DL	216	Chloe Hill
Project DM	217	Samuel Brown	Project DN	218	Madison Baker
Project DO	219	Grayson Green	Project DP	220	Grace Wilson
Project DQ	221	Isaac White	Project DR	222	Chloe Moore
Project DS	223	Samuel Black	Project DT	224	Grace Taylor
Project DU	225	Grayson Brown	Project DV	226	Chloe Adams
Project DW	227	Isaac Green	Project DX	228	Madison King
Project DY	229	Samuel White	Project DZ	230	Grace Hill
Project EA	231	Grayson Black	Project EB	232	Chloe Baker
Project EC	233	Isaac Brown	Project ED	234	Madison Wilson
Project EE	235	Samuel Green	Project EF	236	Grace Moore
Project EG	237	Grayson White	Project EH	238	Chloe Taylor
Project EI	239	Isaac Black	Project EJ	240	Madison Adams
Project EK	241	Samuel Brown	Project EL	242	Grace King
Project EM	243	Grayson Green	Project EN	244	Chloe Hill
Project EO	245	Isaac White	Project EP	246	Madison Baker
Project EQ	247	Samuel Black	Project ER	248	Grace Wilson
Project ES	249	Grayson Brown	Project ET	250	Chloe Moore
Project EU	251	Isaac Green	Project EV	252	Grace Taylor
Project EW	253	Samuel White	Project EX	254	Chloe Adams
Project EY	255	Grayson Black	Project EZ	256	Madison King
Project FA	257	Isaac Brown	Project FB	258	Grace Hill
Project FC	259	Samuel Green	Project FD	260	Chloe Baker
Project FE	261	Grayson White	Project FE	262	Madison Wilson
Project FG	263	Isaac Black	Project FG	264	Grace Moore
Project FH	265	Samuel Brown	Project FH	266	Chloe Taylor
Project FI	267	Grayson Green	Project FI	268	Madison Adams
Project FJ	269	Isaac White	Project FJ	270	Grace King
Project FK	271	Samuel Black	Project FK	272	Chloe Hill
Project FL	273	Grayson Brown	Project FL	274	Madison Baker
Project FM	275	Isaac Green	Project FM	276	Grace Wilson
Project FO	277	Samuel White	Project FO	278	Chloe Moore
Project FP	279	Grayson Black	Project FP	280	Grace Taylor
Project FQ	281	Isaac Brown	Project FQ	282	Chloe Adams
Project FR	283	Samuel Green	Project FR	284	Madison King
Project FS	285	Grayson White	Project FS	286	Grace Hill
Project FT	287	Isaac Black	Project FT	288	Chloe Baker
Project FU	289	Samuel Brown	Project FU	290	Madison Wilson
Project FV	291	Grayson Green	Project FV	292	Grace Moore
Project FW	293	Isaac White	Project FW	294	Chloe Taylor
Project FX	295	Samuel Black	Project FX	296	Madison Adams
Project FY	297	Grayson Brown	Project FY	298	Grace King
Project FZ	299	Isaac Green	Project FZ	300	Chloe Hill
Project GA	301	Samuel White	Project GA	302	Madison Baker
Project GB	303	Grayson Black	Project GB	304	Grace Wilson
Project GC	305	Isaac Brown	Project GC	306	Chloe Moore
Project GD	307	Samuel Green	Project GD	308	Grace Taylor
Project GE	309	Grayson White	Project GE	310	Chloe Adams
Project GF	311	Isaac Black	Project GF	312	Madison King
Project GG	313	Samuel Brown	Project GG	314	Grace Hill
Project GH	315	Grayson Green	Project GH	316	Chloe Baker
Project GI	317	Isaac White	Project GI	318	Madison Wilson
Project GJ	319	Samuel Black	Project GJ	320	Grace Moore
Project GK	321	Grayson Brown	Project GK	322	Chloe Taylor
Project GL	323	Isaac Green	Project GL	324	Madison Adams
Project GM	325	Samuel White	Project GM	326	Grace King
Project GN	327	Grayson Black	Project GN	328	Chloe Hill
Project GO	329	Isaac Brown	Project GO	330	Madison Baker
Project GP	331	Samuel Green	Project GP	332	Grace Wilson
Project GQ	333	Grayson White	Project GQ	334	Chloe Moore
Project GR	335	Isaac Black	Project GR	336	Grace Taylor
Project GS	337	Samuel Brown	Project GS	338	Chloe Adams
Project GT	339	Grayson Green	Project GT	340	Madison King
Project GU	341	Isaac White	Project GU	342	Grace Hill
Project GV	343	Samuel Black	Project GV	344	Chloe Baker
Project GW	345	Grayson Brown	Project GW	346	Madison Wilson
Project GX	347	Isaac Green	Project GX	348	Grace Moore
Project GY	349	Samuel White	Project GY	350	Chloe Taylor
Project GZ	351	Grayson Black	Project GZ	352	Madison Adams
Project HA	353	Isaac Brown	Project HA	354	Grace King
Project HB	355	Samuel Green	Project HB	356	Chloe Hill
Project HC	357	Grayson White	Project HC	358	Madison Baker
Project HD	359	Isaac Black	Project HD	360	Grace Wilson
Project HE	361	Samuel Brown	Project HE	362	Chloe Moore
Project HF	363	Grayson Green	Project HF	364	Grace Taylor
Project HG	365	Isaac White	Project HG	366	Chloe Adams
Project HH	367	Samuel Black	Project HH	368	Madison King
Project HI	369	Grayson Brown	Project HI	370	Grace Hill
Project HJ	371	Isaac Green	Project HJ	372	Chloe Baker
Project HK	373	Samuel White	Project HK	374	Madison Wilson
Project HL	375	Grayson Black	Project HL	376	Grace Moore
Project HM	377	Isaac Brown	Project HM	378	Chloe Taylor
Project HN	379	Samuel Green	Project HN	380	Madison Adams
Project HO	381	Grayson White	Project HO	382	Grace King
Project HP	383	Isaac Black	Project HP	384	Chloe Hill
Project HQ	385	Samuel Brown	Project HQ	386	Madison Baker
Project HR	387	Grayson Green	Project HR	388	Grace Wilson
Project HS	389	Isaac White	Project HS	390	Chloe Moore
Project HT	391	Samuel Black	Project HT	392	Grace Taylor
Project HU	393	Grayson Brown	Project HU	394	Chloe Adams
Project HV	395	Isaac Green	Project HV	396	Madison King
Project HW	397	Samuel White	Project HW	398	Grace Hill
Project HX	399	Grayson Black	Project HX	400	Chloe Baker
Project HY	401	Isaac Brown	Project HY	402	Madison Wilson
Project HZ	403	Samuel Green	Project HZ	404	Grace Moore
Project IA	405	Grayson White	Project IA	406	Chloe Taylor
Project IB	407	Isaac Black	Project IB	408	Madison Adams
Project IC	409	Samuel Brown	Project IC	410	Grace King
Project ID	411	Grayson Green	Project ID	412	Chloe Hill
Project IE	413	Isaac White	Project IE	414	Madison Baker
Project IF	415	Samuel Black	Project IF	416	Grace Wilson
Project IG	417	Grayson Brown	Project IG	418	Chloe Moore
Project IH	419	Isaac Green	Project IH	420	Grace Taylor
Project II	421	Samuel White	Project II	422	Chloe Adams
Project IJ	423	Grayson Black	Project IJ	424	Madison King
Project IK	425	Isaac Brown	Project IK	426	Grace Hill
Project IL	427	Samuel Green	Project IL	428	Chloe Baker
Project IM	429	Grayson White	Project IM	430	Madison Wilson
Project IN	431	Isaac Black	Project IN	432	Grace Moore
Project IO	433	Samuel Brown	Project IO	434	Chloe Taylor
Project IP	435	Grayson Green	Project IP	436	Madison Adams
Project IQ	437	Isaac White	Project IQ	438	Grace King
Project IR	439	Samuel Black	Project IR	440	Chloe Hill
Project IS	441	Grayson Brown	Project IS	442	Madison Baker
Project IT	443	Isaac Green	Project IT	444	Grace Wilson
Project IU	445	Samuel White	Project IU	446	Chloe Moore
Project IV	447	Grayson Black	Project IV	448	Grace Taylor
Project IW	449	Isaac Brown	Project IW	450	Chloe Adams
Project IX	451	Samuel Green	Project IX	452	Madison King
Project IY	453	Grayson White	Project IY	454	Grace Hill
Project IZ	455	Isaac Black	Project IZ	456	Chloe Baker
Project JA	457	Samuel Brown	Project JA	458	Madison Wilson
Project JB	459	Grayson Green	Project JB	460	Grace Moore
Project JC	461	Isaac White	Project JC	462	Chloe Taylor
Project JD	463	Samuel Black	Project JD	464	Madison Adams
Project JE	465	Grayson Brown	Project JE	466	Grace King
Project JF	467	Isaac Green	Project JF	468	Chloe Hill
Project JG	469	Samuel White	Project JG	470	Madison Baker
Project JH	471	Grayson Black	Project JH	472	Grace Wilson
Project JI	473	Isaac Brown	Project JI	474	Chloe Moore
Project JJ	475	Samuel Green	Project JJ	476	Grace Taylor
Project JK	477	Grayson White	Project JK	478	Chloe Adams
Project JL	479	Isaac Black	Project JL	480	Madison King
Project JM	481	Samuel Brown	Project JM	482	Grace Hill
Project JN	483	Grayson Green	Project JN	484	Chloe Baker
Project JO	485	Isaac White	Project JO	486	Madison Wilson
Project JP	487	Samuel Black	Project JP	488	Grace Moore
Project JQ	489	Grayson Brown	Project JQ	490	Chloe Taylor
Project JR	491	Isaac Green	Project JR	492	Madison Adams
Project JS	493	Samuel White	Project JS	494	Grace King
Project JT	495	Grayson Black	Project JT	496	Chloe Hill
Project JU	497	Isaac Brown	Project JU	498	Madison Baker
Project JV	499	Samuel Green	Project JV	500	Grace Wilson

Table 1. (Continued)

Book	Volts		E.M.F. Potential		Efficiency	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	14	2	6	1.5	23	1
B	3	0.5	5	1.5	16	2.5
C	6	0.25	7	0.75	17	0.5
D	7	1	6	4	20	2
E	16	0.75	-	-	-	-
F	13	0.25	14	1.25	50	3
G	4	3	18	6	13	1
H	6	0.5	2	0.25	44	0.5
I	5	0.5	34	0.5	-	-
J	17	1	-	-	-	-
K	15	0.25	11	1.5	-	-
L	7	-	-	-	-	-
M	17	1	3	1	35	0.25
N	5	1.75	-	-	-	-
O	15	1.5	-	-	-	-
Approximate Average Pages		1		1		0.75
Range of Pages		0 - 3		0 - 6		0 - 3
Number of Books Included Item	15		10		8	
Median Relative Positions	8.75		14.5		50.5	
Relative Position of Item, Based on Median	VI		IX		XLV	

Table 1. (Continued)

Book	Conductance		Ohm		Circular Mil	
	Resistance		Ohm's Law		Resistance of Wire Wires	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	8	2	15	3	9	14
B	4	0.5	7	3	19	5
C	5	2.5	9	3	11	4.5
D	10	4	13	3.5	15	10
E	14	1	19	-	-	-
F	6	8	15	1.25	8	7
G	5	1	6	2	15	9
H	7	1.5	8	1.5	27	4
I	7	1	15	8.5	-	-
J	21	5	18	-	15	2.5
K	30	5	21	9.5	28	0.5
L	20	-	19	2	47	1
M	16	1	18	3	30	2
N	6	1.5	22	8	27	4
O	16	5.5	20	6.5	45	0.75
Approximate Average Pages		2.5		3.75		4.25
Range of Pages		0 - 8		0 - 9.5		0 - 14
Number of Books Included Item	15		15		13	
Median Relative Positions	7		15.10		25.17	
Relative Position of Item, Based on Median	IV		XI		XXII	

Table 1. Results of the Survey of the Attitudes of Physicians Toward the Use of the Term "Mental Retardation" in the Medical Literature, 1950-1959					
Year	Number of Physicians	Number of Responses	Percentage of Responses	Number of Responses	Percentage of Responses
1950	100	85	85%	10	10%
1951	100	90	90%	10	10%
1952	100	95	95%	5	5%
1953	100	100	100%	0	0%
1954	100	100	100%	0	0%
1955	100	100	100%	0	0%
1956	100	100	100%	0	0%
1957	100	100	100%	0	0%
1958	100	100	100%	0	0%
1959	100	100	100%	0	0%
Total	1000	870	87%	20	2%

The results of the survey indicate that the majority of physicians (87%) are in favor of the use of the term "mental retardation" in the medical literature. This is in contrast to the findings of a previous survey conducted in 1947, in which only 60% of the physicians were in favor of the term.

Table 1. (Continued)

Book	Measure Resistance with Voltmeter and Ammeter		Measure Resistance - All Other Methods		Fuses	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	37	1	38	25	41	2
B	10	0.5	22	21	17	-
C	41	1	42	9	20	1
D	-	-	-	-	-	-
E	-	-	-	-	32	1.5
F	30	2	31	11	88	2
G	7	0.5	-	-	-	-
H	13	1	26	3	15	1
I	-	-	-	-	Photo Only	
J	-	-	-	-	24	5
K	-	-	31	1.5	2	-
L	39	1	-	-	35	0.25
M	27	2	29	4.5	44	0.75
N	23	0.25	-	-	31	2
O	19	1	-	-	37	3
Approximate Average Pages		0.75		5		1.25
Range of Pages		0 - 2		0 - 25		0 - 5
Number of Books Included Item	10		7		12	
Median Relative Positions	38.5		-		36.75	
Relative Position of Item, Based on Median	XXXV		-		XXXIII	

Table 1. (Continued)

Book	Parallel Circuits		Series Circuits		Parallel Series	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	17	3	17	1	19	1
B	12	5	11	2.5	-	-
C	13	3.5	12	2	14	1.5
D	22	5.5	21	2	23	0.25
E	21	0.25	22	0.25	-	-
F	17	3.5	7	0.75	18	1.5
G	9	11	8	10	-	-
H	30	2.25	11	5	31	1
I	18	2	27	6.5	-	-
J	-	-	-	-	-	-
K	19	0.5	18	1	20	3.5
L	-	-	-	-	-	-
M	20	6	19	3.5	22	3
N	30	5	29	3	-	-
O	47	2.25	46	1	-	-
Approximate Average Pages		3.25		2.5		0.75
Range of Pages		0 - 11		0 - 10		0 - 3.5
Number of Books Included Item	13		13		7	
Median Relative Positions	21.5		19.83		-	
Relative Position of Item, Based on Median	XVII		XIV		-	

1900-1901		1901-1902		1902-1903		Total
Year	Month	Year	Month	Year	Month	
1900	Jan	1901	Jan	1902	Jan	Total
1900	Feb	1901	Feb	1902	Feb	
1900	Mar	1901	Mar	1902	Mar	
1900	Apr	1901	Apr	1902	Apr	
1900	May	1901	May	1902	May	
1900	Jun	1901	Jun	1902	Jun	
1900	Jul	1901	Jul	1902	Jul	
1900	Aug	1901	Aug	1902	Aug	
1900	Sep	1901	Sep	1902	Sep	
1900	Oct	1901	Oct	1902	Oct	
1900	Nov	1901	Nov	1902	Nov	
1900	Dec	1901	Dec	1902	Dec	
1901	Jan	1902	Jan	1903	Jan	Total
1901	Feb	1902	Feb	1903	Feb	
1901	Mar	1902	Mar	1903	Mar	
1901	Apr	1902	Apr	1903	Apr	
1901	May	1902	May	1903	May	
1901	Jun	1902	Jun	1903	Jun	
1901	Jul	1902	Jul	1903	Jul	
1901	Aug	1902	Aug	1903	Aug	
1901	Sep	1902	Sep	1903	Sep	
1901	Oct	1902	Oct	1903	Oct	
1901	Nov	1902	Nov	1903	Nov	
1901	Dec	1902	Dec	1903	Dec	

Table 1. (Continued)

Book	Battery Connections Ohm's Law for Batteries		Heating Effect of a Current		Chemical Effects of a Current Electroplating	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	20	16	10	1	11	6
B	-	-	15	3	41	5
C	-	-	18	1.5	51	19.5
D	36	6.5	19	0.5	37	3
E	-	-	28	5	-	-
F	23	8	-	-	26	1
G	21	15	22	4	23	3.5
H	36	1.5	14	1.5	16	3
I	16	6	13	0.5	-	-
J	9	-	22	1	44	7.5
K	3	2.5	23	2	-	-
L	6	2.5	-	-	44	0.5
M	21	4	43	2	6	4
N	17	2	12	0.25	10	0.25
O	11	2	43	4.5	-	-
Approximate Average Pages		4.5		2		3.5
Range of Pages		0 - 16		0 - 5		0 - 19.5
Number of Books Included Item	12		13		11	
Median Relative Positions	21.17		21.17		41.17	
Relative Position of Item, Based on Median	XV		XVI		XI	

Project Name		Location		Status		Remarks
Project ID	Project Name	Site	County	Phase	Progress	
101	Highway 101	101	101	101	101	101
102	Highway 102	102	102	102	102	102
103	Highway 103	103	103	103	103	103
104	Highway 104	104	104	104	104	104
105	Highway 105	105	105	105	105	105
106	Highway 106	106	106	106	106	106
107	Highway 107	107	107	107	107	107
108	Highway 108	108	108	108	108	108
109	Highway 109	109	109	109	109	109
110	Highway 110	110	110	110	110	110
111	Highway 111	111	111	111	111	111
112	Highway 112	112	112	112	112	112
113	Highway 113	113	113	113	113	113
114	Highway 114	114	114	114	114	114
115	Highway 115	115	115	115	115	115
116	Highway 116	116	116	116	116	116
117	Highway 117	117	117	117	117	117
118	Highway 118	118	118	118	118	118
119	Highway 119	119	119	119	119	119
120	Highway 120	120	120	120	120	120
121	Highway 121	121	121	121	121	121
122	Highway 122	122	122	122	122	122
123	Highway 123	123	123	123	123	123
124	Highway 124	124	124	124	124	124
125	Highway 125	125	125	125	125	125
126	Highway 126	126	126	126	126	126
127	Highway 127	127	127	127	127	127
128	Highway 128	128	128	128	128	128
129	Highway 129	129	129	129	129	129
130	Highway 130	130	130	130	130	130
131	Highway 131	131	131	131	131	131
132	Highway 132	132	132	132	132	132
133	Highway 133	133	133	133	133	133
134	Highway 134	134	134	134	134	134
135	Highway 135	135	135	135	135	135
136	Highway 136	136	136	136	136	136
137	Highway 137	137	137	137	137	137
138	Highway 138	138	138	138	138	138
139	Highway 139	139	139	139	139	139
140	Highway 140	140	140	140	140	140
141	Highway 141	141	141	141	141	141
142	Highway 142	142	142	142	142	142
143	Highway 143	143	143	143	143	143
144	Highway 144	144	144	144	144	144
145	Highway 145	145	145	145	145	145
146	Highway 146	146	146	146	146	146
147	Highway 147	147	147	147	147	147
148	Highway 148	148	148	148	148	148
149	Highway 149	149	149	149	149	149
150	Highway 150	150	150	150	150	150
151	Highway 151	151	151	151	151	151
152	Highway 152	152	152	152	152	152
153	Highway 153	153	153	153	153	153
154	Highway 154	154	154	154	154	154
155	Highway 155	155	155	155	155	155
156	Highway 156	156	156	156	156	156
157	Highway 157	157	157	157	157	157
158	Highway 158	158	158	158	158	158
159	Highway 159	159	159	159	159	159
160	Highway 160	160	160	160	160	160
161	Highway 161	161	161	161	161	161
162	Highway 162	162	162	162	162	162
163	Highway 163	163	163	163	163	163
164	Highway 164	164	164	164	164	164
165	Highway 165	165	165	165	165	165
166	Highway 166	166	166	166	166	166
167	Highway 167	167	167	167	167	167
168	Highway 168	168	168	168	168	168
169	Highway 169	169	169	169	169	169
170	Highway 170	170	170	170	170	170
171	Highway 171	171	171	171	171	171
172	Highway 172	172	172	172	172	172
173	Highway 173	173	173	173	173	173
174	Highway 174	174	174	174	174	174
175	Highway 175	175	175	175	175	175
176	Highway 176	176	176	176	176	176
177	Highway 177	177	177	177	177	177
178	Highway 178	178	178	178	178	178
179	Highway 179	179	179	179	179	179
180	Highway 180	180	180	180	180	180
181	Highway 181	181	181	181	181	181
182	Highway 182	182	182	182	182	182
183	Highway 183	183	183	183	183	183
184	Highway 184	184	184	184	184	184
185	Highway 185	185	185	185	185	185
186	Highway 186	186	186	186	186	186
187	Highway 187	187	187	187	187	187
188	Highway 188	188	188	188	188	188
189	Highway 189	189	189	189	189	189
190	Highway 190	190	190	190	190	190
191	Highway 191	191	191	191	191	191
192	Highway 192	192	192	192	192	192
193	Highway 193	193	193	193	193	193
194	Highway 194	194	194	194	194	194
195	Highway 195	195	195	195	195	195
196	Highway 196	196	196	196	196	196
197	Highway 197	197	197	197	197	197
198	Highway 198	198	198	198	198	198
199	Highway 199	199	199	199	199	199
200	Highway 200	200	200	200	200	200

Table 1. (Continued)

Book	Paralleling Generators		Polarity Tester Test A.C.-D.C.		Electromagnetic Electromagnetism Magnetic Effect of Current	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	60	2	12	0.5	26	10
B	33	2.5	-	-	26	3
C	47	3.5	-	-	22	5.5
D	-	-	25	0.5	26	11
E	-	-	-	-	3	2
F	51	2.5	-	-	3	8
G	-	-	-	-	25	2
H	39	5	-	-	20	1
I	-	-	-	-	29	3
J	-	-	-	-	10	7
K	-	-	26	1.5	37	0.5
L	-	-	23	3	10	1
M	-	-	-	-	10	3
N	-	-	-	-	26	1
O	-	-	-	-	4	2
Approximate Average Pages		1.2		0.5		4
Range of Pages		0 - 3.5		0 - 3.		0 - 11
Number of Books Included Item	5		4		15	
Median Relative Positions	-		-		21.5	
Relative Position of Item, Based on Median	-		-		XVIII	

Geographic Area		Population		Economic Data		Notes
Country	Region	Total	Density	GDP (M\$)	Per Capita	
Africa	North	100,000,000	200	10,000,000	100	Major economic challenges include unemployment and infrastructure deficits.
	West	200,000,000	150	20,000,000	100	
	East	150,000,000	180	15,000,000	100	
	South	100,000,000	250	10,000,000	100	
Asia	South	150,000,000	300	15,000,000	100	Rapid economic growth observed in several countries.
	East	200,000,000	250	20,000,000	100	
	Central	100,000,000	200	10,000,000	100	
	North	50,000,000	150	5,000,000	100	
Latin America	North	50,000,000	100	5,000,000	100	Stable economic conditions with moderate growth.
	Central	100,000,000	150	10,000,000	100	
	South	150,000,000	200	15,000,000	100	
	Caribbean	20,000,000	50	2,000,000	100	

Table 1. (Continued)

Book	Magnetic Circuits and Windings		Solenoid Electro Magnet		Electro Magnetic Induction Lenz's Law	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	29	1	27	21	51	10
B	29	8	28	4	31	5
C	26	8.5	23	2	29	8
D	27	42.5	28	12.5	39	23.5
E	-	-	4	6	11	7
F	34	9	5	4	36	2
G	-	-	26	3	39	1
H	-	-	21	1.25	35	1
I	39	1	30	2.5	31	5.25
J	-	-	12	6	35	2.5
K	34	5	35	0.5	39	4
L	-	-	12	2	-	-
M	14	1	11	2	31	3
N	-	-	19	2	41	3.5
O	-	-	5	3	23	3.5
Approximate Average Pages		6.5		4.75		5.25
Range of Pages		0 - 42.5		0.5 - 21		0 - 23.5
Number of Books Included Item	8		15		14	
Median Relative Position	40		21.5		34.5	
Relative Position of Item, Based on Median	XXXVII		XIX		XXVIII	

Table 1. Summary of the data collected during the field study.					
Location	Time	Temperature (°C)	Humidity (%)	Wind Speed (m/s)	Wind Direction
Station 1	08:00	25.0	65.0	1.5	SE
Station 2	09:00	26.5	68.0	2.0	SE
Station 3	10:00	28.0	70.0	2.5	SE
Station 4	11:00	29.5	72.0	3.0	SE
Station 5	12:00	31.0	75.0	3.5	SE
Station 6	13:00	32.5	78.0	4.0	SE
Station 7	14:00	34.0	80.0	4.5	SE
Station 8	15:00	35.5	82.0	5.0	SE
Station 9	16:00	37.0	85.0	5.5	SE
Station 10	17:00	38.5	88.0	6.0	SE
Station 11	18:00	40.0	90.0	6.5	SE
Station 12	19:00	41.5	92.0	7.0	SE
Station 13	20:00	43.0	95.0	7.5	SE
Station 14	21:00	44.5	98.0	8.0	SE
Station 15	22:00	46.0	100.0	8.5	SE
Station 16	23:00	47.5	100.0	9.0	SE
Station 17	00:00	49.0	100.0	9.5	SE
Station 18	01:00	50.5	100.0	10.0	SE
Station 19	02:00	52.0	100.0	10.5	SE
Station 20	03:00	53.5	100.0	11.0	SE
Station 21	04:00	55.0	100.0	11.5	SE
Station 22	05:00	56.5	100.0	12.0	SE
Station 23	06:00	58.0	100.0	12.5	SE
Station 24	07:00	59.5	100.0	13.0	SE
Station 25	08:00	61.0	100.0	13.5	SE
Station 26	09:00	62.5	100.0	14.0	SE
Station 27	10:00	64.0	100.0	14.5	SE
Station 28	11:00	65.5	100.0	15.0	SE
Station 29	12:00	67.0	100.0	15.5	SE
Station 30	13:00	68.5	100.0	16.0	SE
Station 31	14:00	70.0	100.0	16.5	SE
Station 32	15:00	71.5	100.0	17.0	SE
Station 33	16:00	73.0	100.0	17.5	SE
Station 34	17:00	74.5	100.0	18.0	SE
Station 35	18:00	76.0	100.0	18.5	SE
Station 36	19:00	77.5	100.0	19.0	SE
Station 37	20:00	79.0	100.0	19.5	SE
Station 38	21:00	80.5	100.0	20.0	SE
Station 39	22:00	82.0	100.0	20.5	SE
Station 40	23:00	83.5	100.0	21.0	SE
Station 41	00:00	85.0	100.0	21.5	SE
Station 42	01:00	86.5	100.0	22.0	SE
Station 43	02:00	88.0	100.0	22.5	SE
Station 44	03:00	89.5	100.0	23.0	SE
Station 45	04:00	91.0	100.0	23.5	SE
Station 46	05:00	92.5	100.0	24.0	SE
Station 47	06:00	94.0	100.0	24.5	SE
Station 48	07:00	95.5	100.0	25.0	SE
Station 49	08:00	97.0	100.0	25.5	SE
Station 50	09:00	98.5	100.0	26.0	SE
Station 51	10:00	100.0	100.0	26.5	SE
Station 52	11:00	101.5	100.0	27.0	SE
Station 53	12:00	103.0	100.0	27.5	SE
Station 54	13:00	104.5	100.0	28.0	SE
Station 55	14:00	106.0	100.0	28.5	SE
Station 56	15:00	107.5	100.0	29.0	SE
Station 57	16:00	109.0	100.0	29.5	SE
Station 58	17:00	110.5	100.0	30.0	SE
Station 59	18:00	112.0	100.0	30.5	SE
Station 60	19:00	113.5	100.0	31.0	SE
Station 61	20:00	115.0	100.0	31.5	SE
Station 62	21:00	116.5	100.0	32.0	SE
Station 63	22:00	118.0	100.0	32.5	SE
Station 64	23:00	119.5	100.0	33.0	SE
Station 65	00:00	121.0	100.0	33.5	SE
Station 66	01:00	122.5	100.0	34.0	SE
Station 67	02:00	124.0	100.0	34.5	SE
Station 68	03:00	125.5	100.0	35.0	SE
Station 69	04:00	127.0	100.0	35.5	SE
Station 70	05:00	128.5	100.0	36.0	SE
Station 71	06:00	130.0	100.0	36.5	SE
Station 72	07:00	131.5	100.0	37.0	SE
Station 73	08:00	133.0	100.0	37.5	SE
Station 74	09:00	134.5	100.0	38.0	SE
Station 75	10:00	136.0	100.0	38.5	SE
Station 76	11:00	137.5	100.0	39.0	SE
Station 77	12:00	139.0	100.0	39.5	SE
Station 78	13:00	140.5	100.0	40.0	SE
Station 79	14:00	142.0	100.0	40.5	SE
Station 80	15:00	143.5	100.0	41.0	SE
Station 81	16:00	145.0	100.0	41.5	SE
Station 82	17:00	146.5	100.0	42.0	SE
Station 83	18:00	148.0	100.0	42.5	SE
Station 84	19:00	149.5	100.0	43.0	SE
Station 85	20:00	151.0	100.0	43.5	SE
Station 86	21:00	152.5	100.0	44.0	SE
Station 87	22:00	154.0	100.0	44.5	SE
Station 88	23:00	155.5	100.0	45.0	SE
Station 89	00:00	157.0	100.0	45.5	SE
Station 90	01:00	158.5	100.0	46.0	SE
Station 91	02:00	160.0	100.0	46.5	SE
Station 92	03:00	161.5	100.0	47.0	SE
Station 93	04:00	163.0	100.0	47.5	SE
Station 94	05:00	164.5	100.0	48.0	SE
Station 95	06:00	166.0	100.0	48.5	SE
Station 96	07:00	167.5	100.0	49.0	SE
Station 97	08:00	169.0	100.0	49.5	SE
Station 98	09:00	170.5	100.0	50.0	SE
Station 99	10:00	172.0	100.0	50.5	SE
Station 100	11:00	173.5	100.0	51.0	SE
Station 101	12:00	175.0	100.0	51.5	SE
Station 102	13:00	176.5	100.0	52.0	SE
Station 103	14:00	178.0	100.0	52.5	SE
Station 104	15:00	179.5	100.0	53.0	SE
Station 105	16:00	181.0	100.0	53.5	SE
Station 106	17:00	182.5	100.0	54.0	SE
Station 107	18:00	184.0	100.0	54.5	SE
Station 108	19:00	185.5	100.0	55.0	SE
Station 109	20:00	187.0	100.0	55.5	SE
Station 110	21:00	188.5	100.0	56.0	SE
Station 111	22:00	190.0	100.0	56.5	SE
Station 112	23:00	191.5	100.0	57.0	SE
Station 113	00:00	193.0	100.0	57.5	SE
Station 114	01:00	194.5	100.0	58.0	SE
Station 115	02:00	196.0	100.0	58.5	SE
Station 116	03:00	197.5	100.0	59.0	SE
Station 117	04:00	199.0	100.0	59.5	SE
Station 118	05:00	200.5	100.0	60.0	SE
Station 119	06:00	202.0	100.0	60.5	SE
Station 120	07:00	203.5	100.0	61.0	SE
Station 121	08:00	205.0	100.0	61.5	SE
Station 122	09:00	206.5	100.0	62.0	SE
Station 123	10:00	208.0	100.0	62.5	SE
Station 124	11:00	209.5	100.0	63.0	SE
Station 125	12:00	211.0	100.0	63.5	SE
Station 126	13:00	212.5	100.0	64.0	SE
Station 127	14:00	214.0	100.0	64.5	SE
Station 128	15:00	215.5	100.0	65.0	SE
Station 129	16:00	217.0	100.0	65.5	SE
Station 130	17:00	218.5	100.0	66.0	SE
Station 131	18:00	220.0	100.0	66.5	SE
Station 132	19:00	221.5	100.0	67.0	SE
Station 133	20:00	223.0	100.0	67.5	SE
Station 134	21:00	224.5	100.0	68.0	SE
Station 135	22:00	226.0	100.0	68.5	SE
Station 136	23:00	227.5	100.0	69.0	SE
Station 137	00:00	229.0	100.0	69.5	SE
Station 138	01:00	230.5	100.0	70.0	SE
Station 139	02:00	232.0	100.0	70.5	SE
Station 140	03:00	233.5	100.0	71.0	SE
Station 141	04:00	235.0	100.0	71.5	SE
Station 142	05:00	236.5	100.0	72.0	SE
Station 143	06:00	238.0	100.0	72.5	SE
Station 144	07:00	239.5	100.0	73.0	SE
Station 145	08:00	241.0	100.0	73.5	SE
Station 146	09:00	242.5	100.0	74.0	SE
Station 147	10:00	244.0	100.0	74.5	SE
Station 148	11:00	245.5	100.0	75.0	SE
Station 149	12:00	247.0	100.0	75.5	SE
Station 150	13:00	248.5	100.0	76.0	SE
Station 151	14:00	250.0	100.0	76.5	SE
Station 152	15:00	251.5	100.0	77.0	SE
Station 153	16:00	253.0	100.0	77.5	SE
Station 154	17:00	254.5	100.0	78.0	SE
Station 155	18:00	256.0	100.0	78.5	SE
Station 156	19:00	257.5	100.0	79.0	SE
Station 157	20:00	259.0	100.0	79.5	SE
Station 158	21:00	260.5	100.0	80.0	SE
Station 159	22:00	262.0	100.0	80.5	SE
Station 160	23:00	263.5	100.0	81.0	SE
Station 161	00:00	265.0	100.0	81.5	SE
Station 162	01:00	266.5	100.0	82.0	SE
Station 163	02:00	268.0	100.0	82.5	SE
Station 164	03:00	269.5	100.0	83.0	SE
Station 165	04:00	271.0	100.0	83.5	SE
Station 166	05:00	272.5	100.0	84.0	SE
Station 167	06:00	274.0	100.0	84.5	SE
Station 168	07:00	275.5	100.0	85.0	SE
Station 169	08:00	277.0	100.0	85.5	SE
Station 170	09:00	278.5	100.0	86.0	SE
Station 171	10:00	280.0	100.0	86.5	SE
Station 172	11:00	281.5	100.0	87.0	SE
Station 173	12:00	283.0	100.0	87.5	SE
Station 174	13:00	284.5	100.0	88.0	SE
Station 175	14:00	286.0	100.0	88.5	SE
Station 176	15:00	287.5	100.0	89.0	SE
Station 177	16:00	289.0	100.0	89.5	SE
Station 178	17:00	290.5	100.0	90.0	SE
Station 179	18:00	292.0	100.0	90.5	SE
Station 180	19:00	293.5	100.0	91.0	SE
Station 181	20:00	295.0	100.0	91.5	SE
Station 182	21:00	296.5	100.0	92.0	SE
Station 183	22:00	298.0	100.0	92.5	SE
Station 184	23:00	299.5	100.0	93.0	SE
Station 185	00:00	301.0	100.0	93.5	SE
Station 186	01:00	302.5	100.0	94.0	SE
Station 187	02:00	304.0	100.0	94.5	SE
Station 188	03:00	305.5	100.0	95.0	SE
Station 189	04:00	307.0	100.0	95.5	SE
Station 190	05:00	308.5	100.0	96.0	SE
Station 191	06:00	310.0	100.0	96.5	SE
Station 192	07:00	311.5	100.0	97.0	SE
Station 193	08:00	313.0	100.0	97.5	SE
Station 194	09:00	314.5	100.0	98.0	SE
Station 195	10:00	316.0	100.0	98.5	SE
Station 196	11:00	317.5	100.0	99.0	SE
Station 197	12:00	319.0	100.0	99.5	SE
Station 198	13:00	320.5	100.0	100.0	SE
Station 199	14:00	322.0	100.0	100.0	SE
Station 200	15:00	323.5	100.0	100.0	SE

Table 1. (Continued)

Book	Dynamo D.C. Machinery		Generator D.C. Generator		Electro Dynamics Introduction to Motors	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	57	1	58	34	30	11
B	-	-	32	28	35	3
C	43	1	44	24.5	48	3
D	48	0.25	49	43	51	18
E	12	8.5	-	-	26	5
F	44	7.5	45	33	46	13
G	37	3	38	12	40	4
H	-	-	37	25	41	7
I	10	9	12	3.5	33	3
J	30	8	32	-	34	1
K	42	1.5	41	3	44	4.5
L	26	11	-	-	27	2
M	-	-	34	10.5	37	3
N	33	1	34	4	35	0.25
O	26	-	28	3.75	38	10
Approximate Average Pages		3.5		14.5		5.75
Range of Pages		0 - 11		0 - 43		0.25 - 18
Number of Books Included Item	12		13		15	
Median Relative Position	41.17		39.25		36.25	
Relative Position of Item, Based on Median	XXXIX		XXXVI		XXXII	

Section 1		Section 2		Section 3		Section 4	
Item	Description	Item	Description	Item	Description	Item	Description
1	...	2	...	3	...	4	...
5	...	6	...	7	...	8	...
9	...	10	...	11	...	12	...
13	...	14	...	15	...	16	...
17	...	18	...	19	...	20	...
21	...	22	...	23	...	24	...
25	...	26	...	27	...	28	...
29	...	30	...	31	...	32	...
33	...	34	...	35	...	36	...
37	...	38	...	39	...	40	...
41	...	42	...	43	...	44	...
45	...	46	...	47	...	48	...
49	...	50	...	51	...	52	...
53	...	54	...	55	...	56	...
57	...	58	...	59	...	60	...
61	...	62	...	63	...	64	...
65	...	66	...	67	...	68	...
69	...	70	...	71	...	72	...
73	...	74	...	75	...	76	...
77	...	78	...	79	...	80	...
81	...	82	...	83	...	84	...
85	...	86	...	87	...	88	...
89	...	90	...	91	...	92	...
93	...	94	...	95	...	96	...
97	...	98	...	99	...	100	...

Table 1. (Continued)

Book	D.C. Motors, Starters, and Switches		Armature Winding and Armature Reactance		Potentiometer	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	61	27	59	25	34	2.5
B	36	36	34	4.25	-	-
C	49	22.5	45	3	-	-
D	52	20.5	50	26	-	-
E	27	2.5	-	-	-	-
F	47	15	43	13	30	7.5
G	41	17	-	-	-	-
H	42	22.5	40	6	-	-
I	-	-	-	-	-	-
J	-	-	-	-	-	-
K	45	6	-	-	-	-
L	28	2	-	-	-	-
M	38	18.5	40	2.5	-	-
N	36	4	-	-	-	-
O	39	-	-	-	-	-
Approximate Average Pages		13.5		5.25		0.75
Range of Pages		0 - 36		0 - 26		0 - 7.5
Number of Books Included Item	13		7		2	
Median Relative Position	43.5		-		-	
Relative Position of Item, Based on Median	XLI		-		-	

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Section 1		Section 2		Section 3		Notes
Item	Description	Item	Description	Item	Description	
1	...	2	...	3	...	...
4	...	5	...	6	...	...
7	...	8	...	9	...	...
10	...	11	...	12	...	...
13	...	14	...	15	...	...
16	...	17	...	18	...	...
19	...	20	...	21	...	...
22	...	23	...	24	...	...
25	...	26	...	27	...	...
28	...	29	...	30	...	...
31	...	32	...	33	...	...
34	...	35	...	36	...	...
37	...	38	...	39	...	...
40	...	41	...	42	...	...
43	...	44	...	45	...	...
46	...	47	...	48	...	...
49	...	50	...	51	...	...
52	...	53	...	54	...	...
55	...	56	...	57	...	...
58	...	59	...	60	...	...
61	...	62	...	63	...	...
64	...	65	...	66	...	...
67	...	68	...	69	...	...
70	...	71	...	72	...	...
73	...	74	...	75	...	...
76	...	77	...	78	...	...
79	...	80	...	81	...	...
82	...	83	...	84	...	...
85	...	86	...	87	...	...
88	...	89	...	90	...	...
91	...	92	...	93	...	...
94	...	95	...	96	...	...
97	...	98	...	99	...	...
100	...	101	...	102	...	...

Table 1. (Continued)

Book	Ammeters Milli-Ammeters		Voltmeter Milli-Voltmeter		Watt Meter	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	32	18	33	4.5	35	2
B	8	0.75	9	1	14	0.5
C	35	8	36	2	37	2
D	5	-	-	-	-	-
E	20	-	17	-	-	-
F	28	6	29	6	64	5
G	43	7.5	45	4	46	0.5
H	9	1.5	10	1	56	1
I	4	3	6	3.5	-	-
J	-	-	-	-	-	-
K	-	-	22	-	-	-
L	36	4	38	1	40	1
M	24	5	25	4.25	26	2
N	8	0.5	9	1.5	-	-
O	17	1	18	1	-	-
Approximate Average Pages		3.75		2		1
Range of Pages		0 - 18		0 - 6		0 - 2
Number of Books Included Item	13		13		8	
Median Relative Position	22.5		26.5		62.5	
Relative Position of Item, Based on Median	XX		XXV		LII	

Table 1. (Continued)

Book	Galuanometer		Watt Hour Meter Calculate Cost from Readings		Storage Battery	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	31	18	36	7	25	23
B	-	-	-	-	42	11
C	34	5.5	38	2	52	13
D	-	-	-	-	38	13.5
E	-	-	-	-	10	8
F	27	6	33	8	25	16
G	-	-	47	2	24	6
H	-	-	45	3.5	34	3.5
I	-	-	-	-	40	42.5
J	11	0.25	20	-	49	2.5
K	38	0.5	53	2.5	12	6
L	11	-	41	2.5	43	2
M	23	0.75	42	4	7	3.5
N	7	0.5	25	1	16	4.5
O	24	-	22	4	12	7.25
Approximate Average Pages		2		2.5		12
Range of Pages		0 - 18		0 - 8		2.5 - 42.5
Number of Books Included Item	9		11		15	
Median Relative Position	34.5		43		26	
Relative Position of Item, Based on Median	XXIX		XL		XXIV	

Table 1. (Continued)

Book	Heat Effect of Current Capacity of Wires - Tables		Kirchoff's Law		Conductors Insulators	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	39	2	43	11.5	5	1
B	21	3	15	2	49	0.75
C	19	5.5	24	1	8	4
D	16	2.5	-	-	12	1.5
E	31	4	22	9	15	1
F	16	1	-	-	11	1
G	16	3	-	-	14	0.75
H	29	2	-	-	25	0.75
I	-	-	-	-	8	6
J	-	-	-	-	3	2
K	-	-	-	-	27	1
L	46	1	-	-	-	-
M	46	1	-	-	-	-
N	28	1	-	-	26	2
O	44	1	-	-	7	1
Approximate Average Pages		1.75		1.5		1.5
Range of Pages		0 - 5.5		0 - 11.5		0 - 4
Number of Books Included Item	12		4		12	
Median Relative Position	32		-		15.5	
Relative Position of Item, Based on Median	XXVII		-		XII	

Date		Time		Location		Remarks
Day	Month	Hour	Minute	Place	Altitude	
1	1	10	00	...	...	...
2	1	11	00	...	...	...
3	1	12	00	...	...	...
4	1	13	00	...	...	...
5	1	14	00	...	...	...
6	1	15	00	...	...	...
7	1	16	00	...	...	...
8	1	17	00	...	...	...
9	1	18	00	...	...	...
10	1	19	00	...	...	...
11	1	20	00	...	...	...
12	1	21	00	...	...	...
13	1	22	00	...	...	...
14	1	23	00	...	...	...
15	1	24	00	...	...	...
16	1	25	00	...	...	...
17	1	26	00	...	...	...
18	1	27	00	...	...	...
19	1	28	00	...	...	...
20	1	29	00	...	...	...
21	1	30	00	...	...	...
22	1	31	00	...	...	...
23	1	32	00	...	...	...
24	1	33	00	...	...	...
25	1	34	00	...	...	...
26	1	35	00	...	...	...
27	1	36	00	...	...	...
28	1	37	00	...	...	...
29	1	38	00	...	...	...
30	1	39	00	...	...	...
31	1	40	00	...	...	...
32	1	41	00	...	...	...
33	1	42	00	...	...	...
34	1	43	00	...	...	...
35	1	44	00	...	...	...
36	1	45	00	...	...	...
37	1	46	00	...	...	...
38	1	47	00	...	...	...
39	1	48	00	...	...	...
40	1	49	00	...	...	...
41	1	50	00	...	...	...
42	1	51	00	...	...	...
43	1	52	00	...	...	...
44	1	53	00	...	...	...
45	1	54	00	...	...	...
46	1	55	00	...	...	...
47	1	56	00	...	...	...
48	1	57	00	...	...	...
49	1	58	00	...	...	...
50	1	59	00	...	...	...
51	1	60	00	...	...	...
52	1	61	00	...	...	...
53	1	62	00	...	...	...
54	1	63	00	...	...	...
55	1	64	00	...	...	...
56	1	65	00	...	...	...
57	1	66	00	...	...	...
58	1	67	00	...	...	...
59	1	68	00	...	...	...
60	1	69	00	...	...	...
61	1	70	00	...	...	...
62	1	71	00	...	...	...
63	1	72	00	...	...	...
64	1	73	00	...	...	...
65	1	74	00	...	...	...
66	1	75	00	...	...	...
67	1	76	00	...	...	...
68	1	77	00	...	...	...
69	1	78	00	...	...	...
70	1	79	00	...	...	...
71	1	80	00	...	...	...
72	1	81	00	...	...	...
73	1	82	00	...	...	...
74	1	83	00	...	...	...
75	1	84	00	...	...	...
76	1	85	00	...	...	...
77	1	86	00	...	...	...
78	1	87	00	...	...	...
79	1	88	00	...	...	...
80	1	89	00	...	...	...
81	1	90	00	...	...	...
82	1	91	00	...	...	...
83	1	92	00	...	...	...
84	1	93	00	...	...	...
85	1	94	00	...	...	...
86	1	95	00	...	...	...
87	1	96	00	...	...	...
88	1	97	00	...	...	...
89	1	98	00	...	...	...
90	1	99	00	...	...	...
91	1	100	00	...	...	...
92	1	101	00	...	...	...
93	1	102	00	...	...	...
94	1	103	00	...	...	...
95	1	104	00	...	...	...
96	1	105	00	...	...	...
97	1	106	00	...	...	...
98	1	107	00	...	...	...
99	1	108	00	...	...	...
100	1	109	00	...	...	...

Table 1. (Continued)

Book	Resistance vs Temperature		Electric Welding		Heating Devices	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	40	2	42	2.5	43	3
B	20	3.5	-	-	18	0.5
C	10	1.25	86	5	85	7.5
D	17	3	-	-	-	-
E	-	-	-	-	30	0.5
F	9	2	-	-	-	-
G	-	-	-	-	-	-
H	-	-	-	-	-	-
I	-	-	-	-	14	1
J	-	-	-	-	23	1.5
K	32	0.5	-	-	55	1.5
L	-	-	-	-	35	1.25
M	28	1	-	-	-	-
N	-	-	-	-	45	3.5
O	-	-	-	-	48	12
Approximate Average Pages		1		3.75		2.25
Range of Pages		0 - 3.5		2.5 - 5		0 - 7.5
Number of Books Included Item	7		2		10	
Median Relative Position	-		-		47.5	
Relative Position of Item, Based on Median	-		-		XLII	

Project Information		Financial Summary		Operational Data		Notes
Project ID	Project Name	Budget (USD)	Actual Cost (USD)	Units Produced	Efficiency (%)	
P001	Project Alpha	100,000	95,000	1,200	85%	On schedule
P002	Project Beta	150,000	155,000	1,500	80%	Minor delays
P003	Project Gamma	200,000	190,000	1,800	90%	Exceeded expectations
P004	Project Delta	120,000	125,000	1,100	75%	Cost overrun
P005	Project Epsilon	180,000	175,000	1,600	88%	Good progress
P006	Project Zeta	110,000	112,000	1,300	82%	Stable performance
P007	Project Eta	130,000	128,000	1,400	87%	Efficient execution
P008	Project Theta	160,000	165,000	1,700	78%	Scope creep
P009	Project Iota	140,000	138,000	1,550	89%	High quality
P010	Project Kappa	170,000	172,000	1,650	81%	Minor issues

Table 1. (Continued)

Book	Thermo-Couple Thermo-Pile Pyrometer		Three Wire System One Phase of D.C.		Interior Wiring House Wiring Wiring Devices	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	44	3	50	1	63	2
B	23	0.75	44	3.5	-	-
C	87	3	77	2	79	6
D	34	6.5	70	9.5	-	-
E	-	-	-	-	-	-
F	-	-	78	4	88	24.5
G	30	1	17	6	10	11.5
H	-	-	66	6	-	-
I	-	-	22	7.5	-	-
J	-	-	-	-	25	2.5
K	-	-	25	4	51	4
L	-	-	-	-	34	13.5
M	-	-	71	1.5	72	0.5
N	14	-	-	-	47	7
O	-	-	34	2.5	35	14.5
Approximate Average Pages		9.75		3.25		5.75
Range of Pages		0 - 6.5		0 - 9.5		0 - 24.5
Number of Books Included Item	6		11		10	
Median Relative Position	-		68		73	
Relative Position of Item, Based on Median	-		LV		LVIII	

Section 1		Section 2		Section 3		Notes
Item	Value	Item	Value	Item	Value	
1	100	2	200	3	300	Detailed notes and calculations for each section.
4	400	5	500	6	600	
7	700	8	800	9	900	Additional notes and calculations.
10	1000	11	1100	12	1200	
13	1300	14	1400	15	1500	Final summary and totals.
16	1600	17	1700	18	1800	
19	1900	20	2000	21	2100	Concluding remarks and final checks.
22	2200	23	2300	24	2400	
25	2500	26	2600	27	2700	Final verification and sign-off.
28	2800	29	2900	30	3000	
31	3100	32	3200	33	3300	Overall summary and final conclusions.
34	3400	35	3500	36	3600	
37	3700	38	3800	39	3900	Final review and approval.
40	4000	41	4100	42	4200	
43	4300	44	4400	45	4500	Final report and recommendations.
46	4600	47	4700	48	4800	
49	4900	50	5000	51	5100	Final summary and closing.
52	5200	53	5300	54	5400	
55	5500	56	5600	57	5700	Final remarks and signature.
58	5800	59	5900	60	6000	
61	6100	62	6200	63	6300	Final report and recommendations.
64	6400	65	6500	66	6600	
67	6700	68	6800	69	6900	Final summary and closing.
70	7000	71	7100	72	7200	
73	7300	74	7400	75	7500	Final remarks and signature.
76	7600	77	7700	78	7800	
79	7900	80	8000	81	8100	Final report and recommendations.
82	8200	83	8300	84	8400	
85	8500	86	8600	87	8700	Final summary and closing.
88	8800	89	8900	90	9000	
91	9100	92	9200	93	9300	Final remarks and signature.
94	9400	95	9500	96	9600	
97	9700	98	9800	99	9900	Final report and recommendations.
100	10000	101	10100	102	10200	

Table 1. (Continued)

Book	Bells, Signalling Devices Bell Wiring		Calibrate Instruments		Coloumb	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	-	-	-	-	13	2
B	-	-	-	-	2	-
C	24	3.5	39	4	40	-
D	29	0.25	-	-	11	-
E	6	1.75	-	-	-	-
F	86	5	-	-	12	0.25
G	28	15	44	0.5	3	0.25
H	22	0.5	-	-	4	-
I	28	13	-	-	-	-
J	14	5	-	-	-	-
K	52	6	-	-	13	-
L	13	7	37	0.5	-	-
M	13	0.5	-	-	15	0.5
N	48	1	-	-	-	-
O	6	10	-	-	14	0.25
Approximate Average Pages		3.75		0.25		0.25
Range of Pages		0 - 15		0 - 4		0 - 2
Number of Books Included Item	13		3		10	
Median Relative Position	25.5		-		15	
Relative Position of Item, Based on Median	XXIII		-		X	

Table 1. (Continued)

Book	Volts Drop Line Drop Measure Volts		Other Measuring Instruments		Prony Brake	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	21	14	14	6	62	1
B	6	1	-	-	36	1
C	83	0.25	-	-	50	1.5
D	8	2	-	-	53	1.5
E	-	-	-	-	-	-
F	20	2	66	6	48	3.5
G	11	4	-	-	-	-
H	12	3.25	-	-	-	-
I	19	0.5	-	-	-	-
J	-	-	-	-	-	-
K	24	0.75	-	-	-	-
L	-	-	-	-	-	-
M	47	0.5	69	3	39	2
N	32	1	-	-	-	-
O	-	-	-	-	-	-
Approximate Average Pages		1.75		1		0.75
Range of Pages		0 - 14		0 - 6		0 - 3.5
Number of Books Included Item	11		3		6	
Median Relative Position	23.5		-		-	
Relative Position of Item, Based on Median	XXI		-		-	

DATE		PARTICULARS		AMOUNT	
DAY	MONTH	DEBIT	CREDIT	DEBIT	CREDIT
1	1				
2	1				
3	1				
4	1				
5	1				
6	1				
7	1				
8	1				
9	1				
10	1				
11	1				
12	1				
13	1				
14	1				
15	1				
16	1				
17	1				
18	1				
19	1				
20	1				
21	1				
22	1				
23	1				
24	1				
25	1				
26	1				
27	1				
28	1				
29	1				
30	1				
31	1				
1	2				
2	2				
3	2				
4	2				
5	2				
6	2				
7	2				
8	2				
9	2				
10	2				
11	2				
12	2				
13	2				
14	2				
15	2				
16	2				
17	2				
18	2				
19	2				
20	2				
21	2				
22	2				
23	2				
24	2				
25	2				
26	2				
27	2				
28	2				
29	2				
30	2				
31	2				

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Table 1. (Continued)

Book	Dynamo Troubles		Introduction to A.C.		Eddy Currents	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	-	-	64	12.5	52	2
B	-	-	52	14	38	2
C	-	-	53	14	46	-
D	-	-	54	10.75	47	5.5
E	-	-	-	-	-	-
F	-	-	54	26	49	0.5
G	42	20	-	-	-	-
H	38	2.5	46	8.5	62	0.5
I	-	-	11	0.25	36	0.25
J	-	-	33	2	-	-
K	-	-	5	1	-	-
L	-	-	24	3	-	-
M	-	-	48	4	58	0.25
N	-	-	11	1.5	-	-
O	-	-	25	2.25	-	-
Approximate Average Pages		1.5		6.25		0.75
Range of Pages		0 - 22		0 - 26		0 - 2
Number of Books Included Item	2		13		8	
Median Relative Position	-		49.25		62.5	
Relative Position of Item, Based on Median	-		XLIII		LIII	

Section 1		Section 2		Section 3		Notes
Item	Description	Item	Description	Item	Description	
1	...	2	...	3	...	...
4	...	5	...	6	...	
7	...	8	...	9	...	...
10	...	11	...	12	...	
13	...	14	...	15	...	...
16	...	17	...	18	...	
19	...	20	...	21	...	...
22	...	23	...	24	...	
25	...	26	...	27	...	...
28	...	29	...	30	...	
31	...	32	...	33	...	...
34	...	35	...	36	...	
37	...	38	...	39	...	...
40	...	41	...	42	...	
43	...	44	...	45	...	...
46	...	47	...	48	...	
49	...	50	...	51	...	...
52	...	53	...	54	...	
55	...	56	...	57	...	...
58	...	59	...	60	...	
61	...	62	...	63	...	...
64	...	65	...	66	...	
67	...	68	...	69	...	...
70	...	71	...	72	...	
73	...	74	...	75	...	...
76	...	77	...	78	...	
79	...	80	...	81	...	...
82	...	83	...	84	...	
85	...	86	...	87	...	...
88	...	89	...	90	...	
91	...	92	...	93	...	...
94	...	95	...	96	...	
97	...	98	...	99	...	...
100	...	101	...	102	...	

Table 1. (Continued)

Book	Hysteresis		Self-Induction		Metal Inductance	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	53	1	54	5	56	0.25
B	30	4.5	48	9.5	45	2
C	37	2	33	2	30	2
D	32	3.5	45	20.25	42	10
E	-	-	-	-	-	-
F	35	2.5	37	6	38	2.5
G	-	-	-	-	-	-
H	-	-	49	1.5	-	-
I	38	1	35	2	-	-
J	-	-	-	-	-	-
K	-	-	66	1	65	0.5
L	-	-	-	-	-	-
M	59	2	50	0.25	49	1
N	-	-	-	-	-	-
O	-	-	-	-	-	-
Approximate Average Pages		1		3.25		0.5
Range of Pages		0 - 4.5		0 - 20.25		0 - 2.5
Number of Books Included Item	7		9		7	
Median Relative Position	-		55		-	
Relative Position of Item, Based on Median	-		XLVI		-	

Project Information		Financial Summary		Operational Data		Notes
Project ID	Project Name	Budget (USD)	Actual (USD)	Units Produced	Units Sold	
P001	Project Alpha	10000	9500	1200	1150	On schedule
P002	Project Beta	15000	14000	1800	1700	Minor delays
P003	Project Gamma	20000	19000	2400	2300	Good progress
P004	Project Delta	25000	24000	3000	2900	Completed
P005	Project Epsilon	30000	28000	3600	3500	On track
P006	Project Zeta	35000	33000	4200	4100	Minor issues
P007	Project Eta	40000	38000	4800	4700	Good progress
P008	Project Theta	45000	43000	5400	5300	On schedule
P009	Project Iota	50000	48000	6000	5900	Completed
P010	Project Kappa	55000	53000	6600	6500	On track
P011	Project Lambda	60000	58000	7200	7100	Minor delays
P012	Project Mu	65000	63000	7800	7700	Good progress
P013	Project Nu	70000	68000	8400	8300	On schedule
P014	Project Xi	75000	73000	9000	8900	Completed
P015	Project Omicron	80000	78000	9600	9500	On track
P016	Project Pi	85000	83000	10200	10100	Minor issues
P017	Project Rho	90000	88000	10800	10700	Good progress
P018	Project Sigma	95000	93000	11400	11300	On schedule
P019	Project Tau	100000	98000	12000	11900	Completed
P020	Project Upsilon	105000	103000	12600	12500	On track
P021	Project Phi	110000	108000	13200	13100	Minor delays
P022	Project Chi	115000	113000	13800	13700	Good progress
P023	Project Psi	120000	118000	14400	14300	On schedule
P024	Project Omega	125000	123000	15000	14900	Completed
P025	Project Eta	130000	128000	15600	15500	On track
P026	Project Theta	135000	133000	16200	16100	Minor issues
P027	Project Iota	140000	138000	16800	16700	Good progress
P028	Project Kappa	145000	143000	17400	17300	On schedule
P029	Project Lambda	150000	148000	18000	17900	Completed
P030	Project Mu	155000	153000	18600	18500	On track
P031	Project Nu	160000	158000	19200	19100	Minor delays
P032	Project Xi	165000	163000	19800	19700	Good progress
P033	Project Omicron	170000	168000	20400	20300	On schedule
P034	Project Pi	175000	173000	21000	20900	Completed
P035	Project Rho	180000	178000	21600	21500	On track
P036	Project Sigma	185000	183000	22200	22100	Minor issues
P037	Project Tau	190000	188000	22800	22700	Good progress
P038	Project Upsilon	195000	193000	23400	23300	On schedule
P039	Project Phi	200000	198000	24000	23900	Completed
P040	Project Chi	205000	203000	24600	24500	On track
P041	Project Psi	210000	208000	25200	25100	Minor delays
P042	Project Omega	215000	213000	25800	25700	Good progress
P043	Project Eta	220000	218000	26400	26300	On schedule
P044	Project Theta	225000	223000	27000	26900	Completed
P045	Project Iota	230000	228000	27600	27500	On track
P046	Project Kappa	235000	233000	28200	28100	Minor issues
P047	Project Lambda	240000	238000	28800	28700	Good progress
P048	Project Mu	245000	243000	29400	29300	On schedule
P049	Project Nu	250000	248000	30000	29900	Completed
P050	Project Xi	255000	253000	30600	30500	On track
P051	Project Omicron	260000	258000	31200	31100	Minor delays
P052	Project Pi	265000	263000	31800	31700	Good progress
P053	Project Rho	270000	268000	32400	32300	On schedule
P054	Project Sigma	275000	273000	33000	32900	Completed
P055	Project Tau	280000	278000	33600	33500	On track
P056	Project Upsilon	285000	283000	34200	34100	Minor issues
P057	Project Phi	290000	288000	34800	34700	Good progress
P058	Project Chi	295000	293000	35400	35300	On schedule
P059	Project Psi	300000	298000	36000	35900	Completed
P060	Project Omega	305000	303000	36600	36500	On track
P061	Project Eta	310000	308000	37200	37100	Minor delays
P062	Project Theta	315000	313000	37800	37700	Good progress
P063	Project Iota	320000	318000	38400	38300	On schedule
P064	Project Kappa	325000	323000	39000	38900	Completed
P065	Project Lambda	330000	328000	39600	39500	On track
P066	Project Mu	335000	333000	40200	40100	Minor issues
P067	Project Nu	340000	338000	40800	40700	Good progress
P068	Project Xi	345000	343000	41400	41300	On schedule
P069	Project Omicron	350000	348000	42000	41900	Completed
P070	Project Pi	355000	353000	42600	42500	On track
P071	Project Rho	360000	358000	43200	43100	Minor delays
P072	Project Sigma	365000	363000	43800	43700	Good progress
P073	Project Tau	370000	368000	44400	44300	On schedule
P074	Project Upsilon	375000	373000	45000	44900	Completed
P075	Project Phi	380000	378000	45600	45500	On track
P076	Project Chi	385000	383000	46200	46100	Minor issues
P077	Project Psi	390000	388000	46800	46700	Good progress
P078	Project Omega	395000	393000	47400	47300	On schedule
P079	Project Eta	400000	398000	48000	47900	Completed
P080	Project Theta	405000	403000	48600	48500	On track
P081	Project Iota	410000	408000	49200	49100	Minor delays
P082	Project Kappa	415000	413000	49800	49700	Good progress
P083	Project Lambda	420000	418000	50400	50300	On schedule
P084	Project Mu	425000	423000	51000	50900	Completed
P085	Project Nu	430000	428000	51600	51500	On track
P086	Project Xi	435000	433000	52200	52100	Minor issues
P087	Project Omicron	440000	438000	52800	52700	Good progress
P088	Project Pi	445000	443000	53400	53300	On schedule
P089	Project Rho	450000	448000	54000	53900	Completed
P090	Project Sigma	455000	453000	54600	54500	On track
P091	Project Tau	460000	458000	55200	55100	Minor delays
P092	Project Upsilon	465000	463000	55800	55700	Good progress
P093	Project Phi	470000	468000	56400	56300	On schedule
P094	Project Chi	475000	473000	57000	56900	Completed
P095	Project Psi	480000	478000	57600	57500	On track
P096	Project Omega	485000	483000	58200	58100	Minor issues
P097	Project Eta	490000	488000	58800	58700	Good progress
P098	Project Theta	495000	493000	59400	59300	On schedule
P099	Project Iota	500000	498000	60000	59900	Completed
P100	Project Kappa	505000	503000	60600	60500	On track

Table 1. (Continued)

Book	Induction Coil		Power A.C. Circuit		Power Factor	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	55	8.5	66	1	67	3
B	46	5.5	62	1.5	63	6
C	31	2.5	57	1.75	58	2
D	43	1.25	63	6	64	8
E	23	5	-	-	-	-
F	39	3	60	10	61	0.5
G	31	1.5	-	-	-	-
H	59	1	55	1.5	57	1
I	33	10	-	-	-	-
J	37	3	-	-	-	-
K	58	3	-	-	-	-
L	16	12	-	-	-	-
M	32	1.5	61	0.25	60	2.5
N	43	0.75	-	-	-	-
O	31	1.5	-	-	-	-
Approximate Average Pages		4		1.5		1.5
Range of Pages		0.75 - 12		0 - 10		0 - 8
Number of Books Included Item	15		7		7	
Median Relative Position	37		-		-	
Relative Position of Item, Based on Median	XXXIX		-		-	

Name		Address		Telephone		Remarks
First	Last	Street	City	Home	Office	
John	Smith	123 Main St.	Springfield	555-1234	555-5678	
James	Johnson	456 Oak St.	Springfield	555-2345	555-6789	
Robert	Williams	789 Pine St.	Springfield	555-3456	555-7890	
Richard	Brown	101 Elm St.	Springfield	555-4567	555-8901	
Thomas	Miller	202 Maple St.	Springfield	555-5678	555-9012	
Charles	Davis	303 Cedar St.	Springfield	555-6789	555-0123	
George	Garcia	404 Birch St.	Springfield	555-7890	555-1234	
William	Lee	505 Walnut St.	Springfield	555-8901	555-2345	
Frank	White	606 Cherry St.	Springfield	555-9012	555-3456	
Albert	Harris	707 Peach St.	Springfield	555-0123	555-4567	
Donald	Clark	808 Apple St.	Springfield	555-1234	555-5678	
Edward	King	909 Orange St.	Springfield	555-2345	555-6789	
Harold	Wright	1010 Grape St.	Springfield	555-3456	555-7890	
Arthur	Scott	1111 Lemon St.	Springfield	555-4567	555-8901	
Raymond	Green	1212 Lime St.	Springfield	555-5678	555-9012	
Herbert	Baker	1313 Coffee St.	Springfield	555-6789	555-0123	
Carl	Nelson	1414 Tea St.	Springfield	555-7890	555-1234	
Samuel	Phillips	1515 Butter St.	Springfield	555-8901	555-2345	
Walter	Campbell	1616 Honey St.	Springfield	555-9012	555-3456	
Lawrence	Parker	1717 Sugar St.	Springfield	555-0123	555-4567	
John	Evans	1818 Salt St.	Springfield	555-1234	555-5678	
Paul	Roberts	1919 Pepper St.	Springfield	555-2345	555-6789	
Harold	Turner	2020 Corn St.	Springfield	555-3456	555-7890	
Donald	Rice	2121 Bean St.	Springfield	555-4567	555-8901	
Edward	Cook	2222 Lentil St.	Springfield	555-5678	555-9012	
Frank	Morgan	2323 Pea St.	Springfield	555-6789	555-0123	
Albert	Bell	2424 Chickpea St.	Springfield	555-7890	555-1234	
Raymond	Ward	2525 Lima St.	Springfield	555-8901	555-2345	
Herbert	Carter	2626 Soybean St.	Springfield	555-9012	555-3456	
Carl	Meyer	2727 Mung Bean St.	Springfield	555-0123	555-4567	
Samuel	James	2828 Pigeon Pea St.	Springfield	555-1234	555-5678	
Walter	Watson	2929 Cowpea St.	Springfield	555-2345	555-6789	
Lawrence	Brooks	3030 Black Bean St.	Springfield	555-3456	555-7890	
John	Hyde	3131 Kidney Bean St.	Springfield	555-4567	555-8901	
Paul	Glenn	3232 Navy Bean St.	Springfield	555-5678	555-9012	
Harold	Wells	3333 Great Bean St.	Springfield	555-6789	555-0123	
Donald	Long	3434 Broad Bean St.	Springfield	555-7890	555-1234	
Edward	Richardson	3535 Horse Bean St.	Springfield	555-8901	555-2345	
Frank	Cox	3636 Runner Bean St.	Springfield	555-9012	555-3456	
Albert	Hughes	3737 Snake Bean St.	Springfield	555-0123	555-4567	
Raymond	Black	3838 Fava Bean St.	Springfield	555-1234	555-5678	
Herbert	Wheeler	3939 Broad Bean St.	Springfield	555-2345	555-6789	
Carl	Hicks	4040 Kidney Bean St.	Springfield	555-3456	555-7890	
Samuel	Crane	4141 Navy Bean St.	Springfield	555-4567	555-8901	
Walter	Wheeler	4242 Great Bean St.	Springfield	555-5678	555-9012	
Lawrence	Wheeler	4343 Broad Bean St.	Springfield	555-6789	555-0123	
John	Wheeler	4444 Kidney Bean St.	Springfield	555-7890	555-1234	
Paul	Wheeler	4545 Navy Bean St.	Springfield	555-8901	555-2345	
Harold	Wheeler	4646 Great Bean St.	Springfield	555-9012	555-3456	
Donald	Wheeler	4747 Broad Bean St.	Springfield	555-0123	555-4567	
Edward	Wheeler	4848 Kidney Bean St.	Springfield	555-1234	555-5678	
Frank	Wheeler	4949 Navy Bean St.	Springfield	555-2345	555-6789	
Albert	Wheeler	5050 Great Bean St.	Springfield	555-3456	555-7890	

Table 1. (Continued)

Book	Energy Kilowatt Kilowatt Hour Horse Power Watt		Inductive Reactance Inductance Henry		Lyden Jar	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	22	16.5	68	3.5	-	-
B	13	8	57	6.5	-	-
C	16	8	54	8.5	91	1
D	18	14	46	5	-	-
E	29	0.25	-	-	-	-
F	19	5	58	6	42	0.25
G	12	11	-	-	-	-
H	43	13	51	1	-	-
I	23	2.5	-	-	-	-
J	19	2.25	-	-	4	1
K	17	1	16	0.75	7	4
L	21	1	-	-	3	2
M	41	2.75	51	3.5	-	-
N	24	3	44	0.5	-	-
O	21	6	58	0.25	56	0.5
Approximate Average Pages		6.25		2.5		0.5
Range of Pages		0.25-16.5		0 - 8.5		0 - 4
Number of Books Included Item	15		10		6	
Median Relative Position	18.80		58		-	
Relative Position of Item, Based on Median	XIII		L		-	

Sl. No.	Particulars		Amount		Total
	To	By	Rs.	Paise	
1	Balance b/d		1000	00	1000
2	By Cash		500	00	500
3		To Cash	500	00	500
4	By Cash		250	00	250
5		To Cash	250	00	250
6	By Cash		100	00	100
7		To Cash	100	00	100
8	By Cash		50	00	50
9		To Cash	50	00	50
10	By Cash		25	00	25
11		To Cash	25	00	25
12	By Cash		10	00	10
13		To Cash	10	00	10
14	By Cash		5	00	5
15		To Cash	5	00	5
16	By Cash		2	00	2
17		To Cash	2	00	2
18	By Cash		1	00	1
19		To Cash	1	00	1
20	By Cash		0	00	0
21		To Cash	0	00	0
22	By Cash		0	00	0
23		To Cash	0	00	0
24	By Cash		0	00	0
25		To Cash	0	00	0
26	By Cash		0	00	0
27		To Cash	0	00	0
28	By Cash		0	00	0
29		To Cash	0	00	0
30	By Cash		0	00	0
31		To Cash	0	00	0
32	By Cash		0	00	0
33		To Cash	0	00	0
34	By Cash		0	00	0
35		To Cash	0	00	0
36	By Cash		0	00	0
37		To Cash	0	00	0
38	By Cash		0	00	0
39		To Cash	0	00	0
40	By Cash		0	00	0
41		To Cash	0	00	0
42	By Cash		0	00	0
43		To Cash	0	00	0
44	By Cash		0	00	0
45		To Cash	0	00	0
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47		To Cash	0	00	0
48	By Cash		0	00	0
49		To Cash	0	00	0
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51		To Cash	0	00	0
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53		To Cash	0	00	0
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55		To Cash	0	00	0
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57		To Cash	0	00	0
58	By Cash		0	00	0
59		To Cash	0	00	0
60	By Cash		0	00	0
61		To Cash	0	00	0
62	By Cash		0	00	0
63		To Cash	0	00	0
64	By Cash		0	00	0
65		To Cash	0	00	0
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79		To Cash	0	00	0
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81		To Cash	0	00	0
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83		To Cash	0	00	0
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89		To Cash	0	00	0
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213		To Cash	0	00	0
214	By Cash		0	00	0
215		To Cash	0	00	0
216	By Cash		0	00	0
217		To Cash	0	00	0
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219		To Cash	0	00	0
220	By Cash		0	00	0
221		To Cash	0	00	0
222	By Cash		0	00	0
223		To Cash	0	00	0
224	By Cash		0	00	0
225		To Cash	0	00	0
226	By Cash		0	00	0
227		To Cash	0	00	0
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229		To Cash	0	00	0
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231		To Cash	0	00	0
232	By Cash		0	00	0
233		To Cash	0	00	0
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237		To Cash	0	00	0
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239		To Cash	0	00	0
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241		To Cash	0	00	0
242	By Cash		0	00	0
243		To Cash	0	00	0
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245		To Cash	0	00	0
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273		To Cash	0	00	0
274	By Cash		0	00	0
275		To Cash	0	00	0
276	By Cash		0	00	0
277		To Cash	0	00	0
278	By Cash		0	00	0
279		To Cash	0	00	0
280	By Cash		0	00	0
281		To Cash	0	00	0
282	By Cash</				

Table 1. (Continued)

Book	Impedence in Series Circuits		Condensers Capacitance		Capactive Reactance	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	69	3.5	70	5	71	3.5
B	59	7.25	50	21	58	4.5
C	56	1.5	59	6	60	3.5
D	58	25	60	11	61	0.5
E	-	-	-	-	-	-
F	62	13	41	11.5	59	6
G	-	-	29	-	-	-
H	53	2	60	-	-	-
I	-	-	-	-	-	-
J	-	-	-	-	-	-
K	68	2	8	11	67	0.5
L	-	-	-	-	-	-
M	53	6	55	5.5	56	1
N	-	-	-	-	-	-
O	-	-	59	0.5	-	-
Approximate Average Pages		4		4.75		1.25
Range of Pages		0 - 25		0 - 21		0 - 4.5
Number of Books Included Item	8		10		7	
Median Relative Position	69		59.83		-	
Relative Position of Item, Based on Median	LVI		LI		-	

Table 1. (Continued)

Book	A.C. Values Dectors		Lag and Lead		Power Stations Distribution Power Transmission Lines	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	65	-	72	1.5	-	-
B	54	3	56	3	64	6
C	-	-	55	-	72	21.5
D	57	14	55	1	-	-
E	-	-	-	-	13	2
F	56	12	55	1	77	17
G	-	-	-	-	-	-
H	47	0.25	50	1	-	-
I	-	-	-	-	-	-
J	-	-	-	-	38	4.5
K	-	-	-	-	43	0.5
L	-	-	-	-	-	-
M	-	-	52	2	70	5.5
N	-	-	-	-	-	-
O	-	-	-	-	29	37
Approximate Average Pages		2		6.25		6.25
Range of Pages		0 - 14		0 - 3		0 - 37
Number of Books Included Item	5		7		8	
Median Relative Position	-		-		79.5	
Relative Position of Item, Based on Median	-		-		LXI	

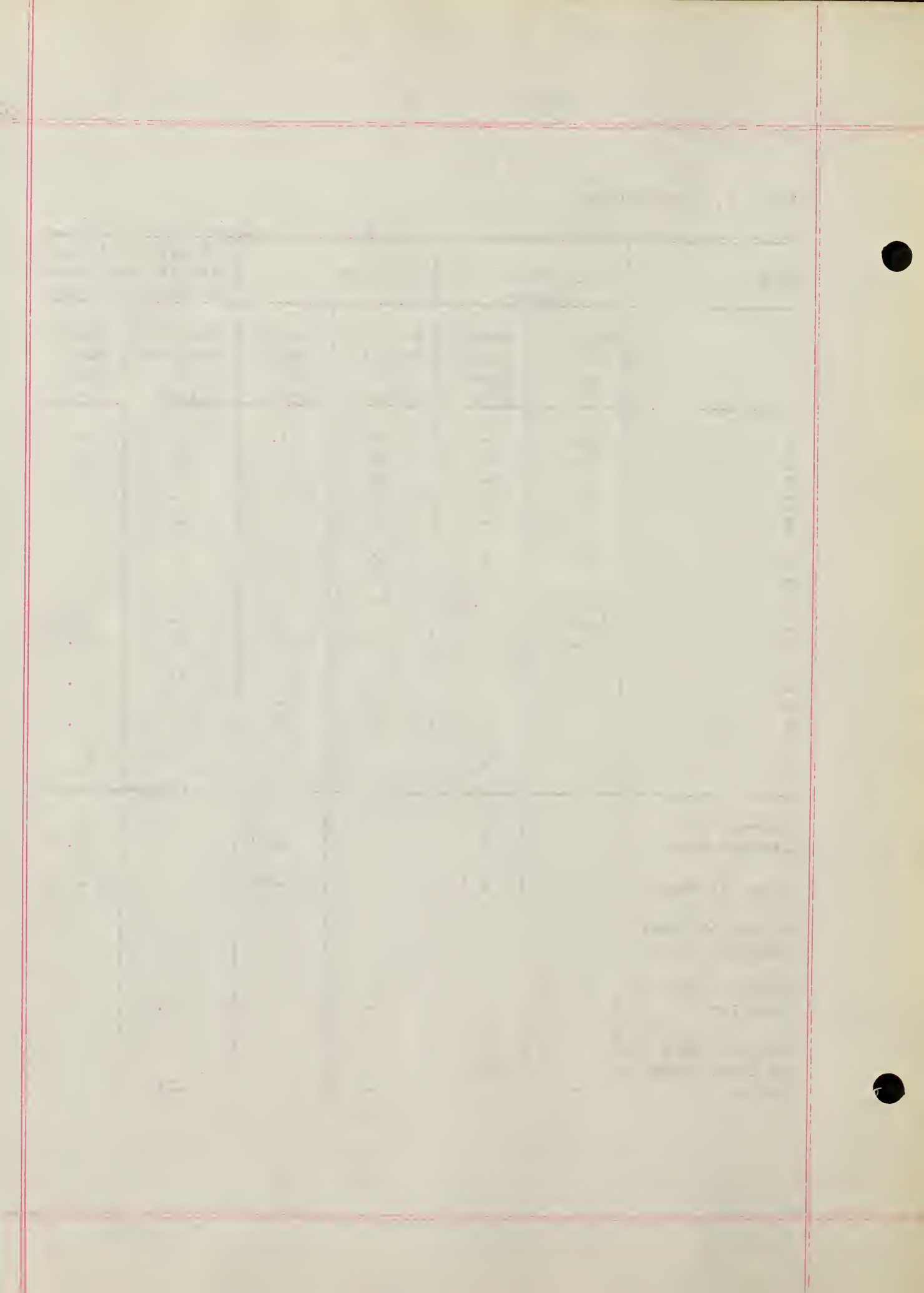


Table 1. (Continued)

Book	Electric Shock		National Electric Code		Ohm's Law for A.C.	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	-	-	-	-	73	1
B	-	-	-	-	55	1.5
C	-	-	27	0.5	61	0.25
D	-	-	-	-	59	3.5
E	-	-	-	-	-	-
F	-	-	-	-	57	2
G	-	-	Mentioned at end		-	-
H	24	0.5	28	0.25	52	0.5
I	-	-	-	-	-	-
J	-	-	-	-	-	-
K	-	-	29	1.5	-	-
L	42	4.5	45	0.25	-	-
M	-	-	-	-	54	1
N	-	-	49	-	-	-
O	-	-	36	0.5	-	-
Approximate Average Pages		0.25		0.25		0.5
Range of Pages		0 - 4.5		0 - 1.5		0 - 3.5
Number of Books Included Item	2		6		7	
Median Relative Position	-		-		-	
Relative Position of Item, Based on Median	-		-		-	

Date		Time		Location	
Day	Month	Hour	Minute	City	State
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9
10	10	10	10	10	10
11	11	11	11	11	11
12	12	12	12	12	12
13	13	13	13	13	13
14	14	14	14	14	14
15	15	15	15	15	15
16	16	16	16	16	16
17	17	17	17	17	17
18	18	18	18	18	18
19	19	19	19	19	19
20	20	20	20	20	20
21	21	21	21	21	21
22	22	22	22	22	22
23	23	23	23	23	23
24	24	24	24	24	24
25	25	25	25	25	25
26	26	26	26	26	26
27	27	27	27	27	27
28	28	28	28	28	28
29	29	29	29	29	29
30	30	30	30	30	30
31	31	31	31	31	31

Table 1. (Continued)

Book	Impedence in Parallel Circuits		Pollyphase Circuits and Systems		Power in Pollyphase	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	74	5.5	75	4	76	3
B	60	13	65	6	66	4
C	-	-	63	1	64	1
D	62	8.5	65	9	68	1.5
E	-	-	-	-	-	-
F	63	6.5	66	8	68	6
G	-	-	-	-	-	-
H	54	1	67	5	69	3
I	-	-	25	5	-	-
J	-	-	-	-	-	-
K	-	-	50	0.25	-	-
L	-	-	-	-	-	-
M	-	-	66	1	-	-
N	-	-	-	-	-	-
O	-	-	-	-	-	-
Approximate Average Pages		2.25		2.5		1.25
Range of Pages		0 - 13		0 - 9		0 - 6
Number of Books Included Item	5		9		6	
Median Relative Position	-		66.83		-	
Relative Position of Item, Based on Median	-		LIV		-	

Project Information		Financial Summary		Operational Data	
Project ID	Project Name	Budget (USD)	Actual Cost (USD)	Units Produced	Quality Score
P001	Project Alpha	100,000	95,000	1,200	92
P002	Project Beta	150,000	148,000	1,500	88
P003	Project Gamma	200,000	205,000	1,800	85
P004	Project Delta	250,000	240,000	2,000	90
P005	Project Epsilon	300,000	295,000	2,200	87
P006	Project Zeta	350,000	345,000	2,400	89
P007	Project Eta	400,000	390,000	2,600	86
P008	Project Theta	450,000	440,000	2,800	88
P009	Project Iota	500,000	495,000	3,000	87
P010	Project Kappa	550,000	540,000	3,200	89
P011	Project Lambda	600,000	590,000	3,400	86
P012	Project Mu	650,000	640,000	3,600	88
P013	Project Nu	700,000	690,000	3,800	87
P014	Project Xi	750,000	740,000	4,000	89
P015	Project Omicron	800,000	790,000	4,200	86
P016	Project Pi	850,000	840,000	4,400	88
P017	Project Rho	900,000	890,000	4,600	87
P018	Project Sigma	950,000	940,000	4,800	89
P019	Project Tau	1,000,000	990,000	5,000	86
P020	Project Upsilon	1,050,000	1,040,000	5,200	88
P021	Project Phi	1,100,000	1,090,000	5,400	87
P022	Project Chi	1,150,000	1,140,000	5,600	89
P023	Project Psi	1,200,000	1,190,000	5,800	86
P024	Project Omega	1,250,000	1,240,000	6,000	88
P025	Project A	1,300,000	1,290,000	6,200	87
P026	Project B	1,350,000	1,340,000	6,400	89
P027	Project C	1,400,000	1,390,000	6,600	86
P028	Project D	1,450,000	1,440,000	6,800	88
P029	Project E	1,500,000	1,490,000	7,000	87
P030	Project F	1,550,000	1,540,000	7,200	89
P031	Project G	1,600,000	1,590,000	7,400	86
P032	Project H	1,650,000	1,640,000	7,600	88
P033	Project I	1,700,000	1,690,000	7,800	87
P034	Project J	1,750,000	1,740,000	8,000	89
P035	Project K	1,800,000	1,790,000	8,200	86
P036	Project L	1,850,000	1,840,000	8,400	88
P037	Project M	1,900,000	1,890,000	8,600	87
P038	Project N	1,950,000	1,940,000	8,800	89
P039	Project O	2,000,000	1,990,000	9,000	86
P040	Project P	2,050,000	2,040,000	9,200	88
P041	Project Q	2,100,000	2,090,000	9,400	87
P042	Project R	2,150,000	2,140,000	9,600	89
P043	Project S	2,200,000	2,190,000	9,800	86
P044	Project T	2,250,000	2,240,000	10,000	88
P045	Project U	2,300,000	2,290,000	10,200	87
P046	Project V	2,350,000	2,340,000	10,400	89
P047	Project W	2,400,000	2,390,000	10,600	86
P048	Project X	2,450,000	2,440,000	10,800	88
P049	Project Y	2,500,000	2,490,000	11,000	87
P050	Project Z	2,550,000	2,540,000	11,200	89

Table 1. (Continued)

Book	Electric Filters		Transformer		A.C. Generator Alternator	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	77	1.5	78	8	79	6
B	61	4	47	1.5	53	5.5
C	-	-	66	17	62	10
D	-	-	69	20	56	21
E	-	-	24	3	-	-
F	-	-	70	38	-	-
G	-	-	-	-	-	-
H	-	-	58	15.5	48	4.25
I	-	-	37	24	-	-
J	-	-	36	3	-	-
K	-	-	48	3.5	40	2
L	-	-	25	1.25	29	0.5
M	-	-	57	12	36	1.25
N	-	-	42	5	37	4
O	-	-	30	8	27	7
Approximate Average Pages		0.25		10.5		4
Range of Pages		0 - 4		0 - 38		0 - 21
Number of Books Included Item	2		14		10	
Median Relative Position	-		49.5		55	
Relative Position of Item, Based on Median	-		XLIV		XLVII	

Section 1		Section 2		Section 3	
Item	Value	Item	Value	Item	Value
1	100	2	200	3	300
4	400	5	500	6	600
7	700	8	800	9	900
10	1000	11	1100	12	1200
13	1300	14	1400	15	1500
16	1600	17	1700	18	1800
19	1900	20	2000	21	2100
22	2200	23	2300	24	2400
25	2500	26	2600	27	2700
28	2800	29	2900	30	3000
31	3100	32	3200	33	3300
34	3400	35	3500	36	3600
37	3700	38	3800	39	3900
40	4000	41	4100	42	4200
43	4300	44	4400	45	4500
46	4600	47	4700	48	4800
49	4900	50	5000	51	5100
52	5200	53	5300	54	5400
55	5500	56	5600	57	5700
58	5800	59	5900	60	6000
61	6100	62	6200	63	6300
64	6400	65	6500	66	6600
67	6700	68	6800	69	6900
70	7000	71	7100	72	7200
73	7300	74	7400	75	7500
76	7600	77	7700	78	7800
79	7900	80	8000	81	8100
82	8200	83	8300	84	8400
85	8500	86	8600	87	8700
88	8800	89	8900	90	9000
91	9100	92	9200	93	9300
94	9400	95	9500	96	9600
97	9700	98	9800	99	9900
100	10000	101	10100	102	10200
103	10300	104	10400	105	10500
106	10600	107	10700	108	10800
109	10900	110	11000	111	11100
112	11200	113	11300	114	11400
115	11500	116	11600	117	11700
118	11800	119	11900	120	12000
121	12100	122	12200	123	12300
124	12400	125	12500	126	12600
127	12700	128	12800	129	12900
130	13000	131	13100	132	13200
133	13300	134	13400	135	13500
136	13600	137	13700	138	13800
139	13900	140	14000	141	14100
142	14200	143	14300	144	14400
145	14500	146	14600	147	14700
148	14800	149	14900	150	15000
151	15100	152	15200	153	15300
154	15400	155	15500	156	15600
157	15700	158	15800	159	15900
160	16000	161	16100	162	16200
163	16300	164	16400	165	16500
166	16600	167	16700	168	16800
169	16900	170	17000	171	17100
172	17200	173	17300	174	17400
175	17500	176	17600	177	17700
178	17800	179	17900	180	18000
181	18100	182	18200	183	18300
184	18400	185	18500	186	18600
187	18700	188	18800	189	18900
190	19000	191	19100	192	19200
193	19300	194	19400	195	19500
196	19600	197	19700	198	19800
199	19900	200	20000	201	20100
202	20200	203	20300	204	20400
205	20500	206	20600	207	20700
208	20800	209	20900	210	21000
211	21100	212	21200	213	21300
214	21400	215	21500	216	21600
217	21700	218	21800	219	21900
220	22000	221	22100	222	22200
223	22300	224	22400	225	22500
226	22600	227	22700	228	22800
229	22900	230	23000	231	23100
232	23200	233	23300	234	23400
235	23500	236	23600	237	23700
238	23800	239	23900	240	24000
241	24100	242	24200	243	24300
244	24400	245	24500	246	24600
247	24700	248	24800	249	24900
250	25000	251	25100	252	25200
253	25300	254	25400	255	25500
256	25600	257	25700	258	25800
259	25900	260	26000	261	26100
262	26200	263	26300	264	26400
265	26500	266	26600	267	26700
268	26800	269	26900	270	27000
271	27100	272	27200	273	27300
274	27400	275	27500	276	27600
277	27700	278	27800	279	27900
280	28000	281	28100	282	28200
283	28300	284	28400	285	28500
286	28600	287	28700	288	28800
289	28900	290	29000	291	29100
292	29200	293	29300	294	29400
295	29500	296	29600	297	29700
298	29800	299	29900	300	30000

Table 1. (Continued)

Book	Synchronous or Rotary Converter		Rectifiers		Polly Phase Induction Motor	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	80	4	81	6	82	7
B	69	1.5	75	8	68	3
C	73	3	75	3	68	10.5
D	40	-	-	-	-	-
E	-	-	-	-	-	-
F	75	10.5	76	5.5	71	28
G	-	-	-	-	-	-
H	-	-	65	2	72	6
I	-	-	42	3	-	-
J	-	-	48	1	-	-
K	47	0.25	-	-	49	0.5
L	-	-	-	-	-	-
M	-	-	62	3.75	64	4
N	-	-	-	-	39	1.5
O	33	1	-	-	40	-
Approximate Average Pages		1.5		2.25		4
Range of Pages		0 - 10.5		0 - 8		0 - 28
Number of Books Included Item	7		8		9	
Median Relative Position	-		82		73.25	
Relative Position of Item, Based on Median	-		LXIII		LVIII	

Project Information		Financial Summary		Operational Data		Notes
Project ID	Project Name	Budget (USD)	Actual (USD)	Units Produced	Units Sold	
P001	Project Alpha	10000	9500	1200	1150	On schedule
P002	Project Beta	15000	14000	1800	1700	Minor delays
P003	Project Gamma	20000	19000	2400	2300	Exceeded expectations
P004	Project Delta	25000	24000	3000	2900	Good progress
P005	Project Epsilon	30000	28000	3600	3500	Significant savings
P006	Project Zeta	35000	33000	4200	4100	High efficiency
P007	Project Eta	40000	38000	4800	4700	Consistent performance
P008	Project Theta	45000	43000	5400	5300	Minor budget variance
P009	Project Iota	50000	48000	6000	5900	Excellent results
P010	Project Kappa	55000	53000	6600	6500	Strong financial performance

Table 1. (Continued)

Book	Poly Phase Motor Starters		Single Phase Motors		Synchronous Motors	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	83	4	84	6	85	3
B	-	-	-	-	-	-
C	71	1.5	69	6.5	70	3.5
D	-	-	-	-	41	-
E	-	-	-	-	-	-
F	72	5	73	11	74	19
G	-	-	-	-	-	-
H	73	1	63	3	64	0.25
I	-	-	24	3	-	-
J	-	-	-	-	-	-
K	-	-	46	1	-	-
L	-	-	-	-	30	0.25
M	67	1	63	3	68	3
N	-	-	38	1.5	40	-
O	-	-	41	-	-	-
Approximate Average Pages		0.75		2.25		2
Range of Pages		0 - 5		0 - 11		0 - 19
Number of Books Included Item	5		9		8	
Median Relative Position	-		73.5		87.5	
Relative Position of Item, Based on Median	-		LIX		LXIV	

Project Information		Project Details		Project Status		Notes
Project Name	Project ID	Project Manager	Project Start Date	Project End Date	Project Status	
Project A	1001	John Doe	2023-01-01	2023-03-31	Completed	Project completed successfully.
Project B	1002	Jane Smith	2023-04-01	2023-06-30	In Progress	Project is currently in progress.
Project C	1003	Mike Johnson	2023-07-01	2023-09-30	On Hold	Project is on hold due to budget constraints.
Project D	1004	Sarah Brown	2023-10-01	2023-12-31	Planned	Project is planned for the next quarter.

Table 1. (Continued)

Book	Motor-Generator Sets		Static Electricity Electro-Static Electric Charges		Electron Theory	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	86	1.5	87	7	88	2
B	-	-	78	19	40	0.5
C	74	-	-	-	92	1.5
D	-	-	14	-	1	24
E	-	-	-	-	8	1
F	-	-	40	12	82	3
G	-	-	-	-	33	1
H	-	-	17	1.5	3	-
I	41	0.5	-	-	-	-
J	47	-	2	2.5	-	-
K	-	-	6	22	4	6.5
L	-	-	2	8.25	-	-
M	-	-	-	-	2	1.5
N	-	-	2	3.5	3	3
O	32	1.25	1	3	10	-
Approximate Average Pages		0.5		5.25		3
Range of Pages		0 - 2.5		0 - 22		0 - 24
Number of Books Included Item	5		10		12	
Median Relative Position	-		35.5		35.5	
Relative Position of Item, Based on Median	-		XXX		XXXI	

Table 1. (Continued)

Book	Radio Tubes Vacuum Tubes and Applications		X-Ray X-Ray Tubes and Other Equipment		Photo-Electric Cell	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	91	4.5	89	4	-	-
B	70	28	71	2.5	72	4.5
C	-	-	95	11.5	-	-
D	-	-	-	-	-	-
E	36	17	-	-	39	1
F	83	28	84	0.5	-	-
G	36	8	-	-	-	-
H	74	3.5	-	-	-	-
I	-	-	-	-	-	-
J	42	4	45	3	-	-
K	61	4.25	64	-	-	-
L	-	-	17	1	-	-
M	-	-	-	-	-	-
N	-	-	-	-	-	-
O	57	9	-	-	-	-
Approximate Average Pages		5.5		1.5		0.25
Range of Pages		0 - 28		0 - 11.5		0 - 4.5
Number of Books Included Item	9		7		2	
Median Relative Position	79.5		-		-	
Relative Position of Item, Based on Median	LXII		-		-	

Date		Page		Page	
Page No.	Date	Page No.	Date	Page No.	Date
1		2		3	
4		5		6	
7		8		9	
10		11		12	
13		14		15	
16		17		18	
19		20		21	
22		23		24	
25		26		27	
28		29		30	
31		32		33	
34		35		36	
37		38		39	
40		41		42	
43		44		45	
46		47		48	
49		50		51	
52		53		54	
55		56		57	
58		59		60	
61		62		63	
64		65		66	
67		68		69	
70		71		72	
73		74		75	
76		77		78	
79		80		81	
82		83		84	
85		86		87	
88		89		90	
91		92		93	
94		95		96	
97		98		99	
100		101		102	

Table 1. (Continued)

Book	Three Phase Alternator		Telegraphy		Y and Delta Connections	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	66	7	92	13	65	2
B	-	-	-	-	67	4
C	65	2.5	25	4.5	67	3
D	-	-	30	1	56	5
E	-	-	5	7	-	-
F	69	57	4	0.5	67	8
G	-	-	34	3	-	-
H	68	3.25	-	-	70	2
I	36	1.5	20	0.25	-	-
J	31	-	13	16.5	-	-
K	-	-	56	1.5	-	-
L	-	-	14	18	-	-
M	-	-	12	1.25	65	0.75
N	-	-	-	-	-	-
O	-	-	-	-	-	-
Approximate Average Pages		4.75		4.5		1.75
Range of Pages		0 - 57		0 - 18		0 - 8
Number of Books Included Item	6		11		7	
Median Relative Position	-		28		-	
Relative Position of Item, Based on Median	-		XXVI		-	

Table 1. (Continued)

Book	Three Phase Three Phase Four Wire		Auto Ignition Auto Systems		Telephone and Systems	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	-	-	51	1.5	93	14.5
B	-	-	-	-	-	-
C	-	-	32	0.5	89	15
D	67	1.25	44	-	31	-
E	-	-	-	-	25	10
F	-	-	53	7	-	-
G	-	-	32	1	35	3
H	71	6	61	2	75	1.5
I	27	2	-	-	21	0.25
J	-	-	39	8.5	26	15
K	-	-	59	3.5	57	5
L	-	-	-	-	15	13
M	-	-	33	-	-	-
N	-	-	-	-	-	-
O	-	-	-	-	52	4
Approximate Average Pages		0.5		1.5		5.5
Range of Pages		0 - 6		0 - 8.5		0 - 15
Number of Books Included Item	3		9		11	
Median Relative Position	-		57.5		58	
Relative Position of Item, Based on Median	-		XLVIII		L	

TABLE 1.1.1.1

General Information		Detailed Data		Summary Statistics		Notes
Item No.	Description	Value 1	Value 2	Average	Standard Deviation	
1	Item 1 Description	100	200	150	50	
2	Item 2 Description	150	250	200	50	
3	Item 3 Description	200	300	250	50	
4	Item 4 Description	250	350	300	50	
5	Item 5 Description	300	400	350	50	
6	Item 6 Description	350	450	400	50	
7	Item 7 Description	400	500	450	50	
8	Item 8 Description	450	550	500	50	
9	Item 9 Description	500	600	550	50	
10	Item 10 Description	550	650	600	50	
11	Item 11 Description	600	700	650	50	
12	Item 12 Description	650	750	700	50	
13	Item 13 Description	700	800	750	50	
14	Item 14 Description	750	850	800	50	
15	Item 15 Description	800	900	850	50	
16	Item 16 Description	850	950	900	50	
17	Item 17 Description	900	1000	950	50	
18	Item 18 Description	950	1050	1000	50	
19	Item 19 Description	1000	1100	1050	50	
20	Item 20 Description	1050	1150	1100	50	
21	Item 21 Description	1100	1200	1150	50	
22	Item 22 Description	1150	1250	1200	50	
23	Item 23 Description	1200	1300	1250	50	
24	Item 24 Description	1250	1350	1300	50	
25	Item 25 Description	1300	1400	1350	50	
26	Item 26 Description	1350	1450	1400	50	
27	Item 27 Description	1400	1500	1450	50	
28	Item 28 Description	1450	1550	1500	50	
29	Item 29 Description	1500	1600	1550	50	
30	Item 30 Description	1550	1650	1600	50	
31	Item 31 Description	1600	1700	1650	50	
32	Item 32 Description	1650	1750	1700	50	
33	Item 33 Description	1700	1800	1750	50	
34	Item 34 Description	1750	1850	1800	50	
35	Item 35 Description	1800	1900	1850	50	
36	Item 36 Description	1850	1950	1900	50	
37	Item 37 Description	1900	2000	1950	50	
38	Item 38 Description	1950	2050	2000	50	
39	Item 39 Description	2000	2100	2050	50	
40	Item 40 Description	2050	2150	2100	50	
41	Item 41 Description	2100	2200	2150	50	
42	Item 42 Description	2150	2250	2200	50	
43	Item 43 Description	2200	2300	2250	50	
44	Item 44 Description	2250	2350	2300	50	
45	Item 45 Description	2300	2400	2350	50	
46	Item 46 Description	2350	2450	2400	50	
47	Item 47 Description	2400	2500	2450	50	
48	Item 48 Description	2450	2550	2500	50	
49	Item 49 Description	2500	2600	2550	50	
50	Item 50 Description	2550	2650	2600	50	
51	Item 51 Description	2600	2700	2650	50	
52	Item 52 Description	2650	2750	2700	50	
53	Item 53 Description	2700	2800	2750	50	
54	Item 54 Description	2750	2850	2800	50	
55	Item 55 Description	2800	2900	2850	50	
56	Item 56 Description	2850	2950	2900	50	
57	Item 57 Description	2900	3000	2950	50	
58	Item 58 Description	2950	3050	3000	50	
59	Item 59 Description	3000	3100	3050	50	
60	Item 60 Description	3050	3150	3100	50	
61	Item 61 Description	3100	3200	3150	50	
62	Item 62 Description	3150	3250	3200	50	
63	Item 63 Description	3200	3300	3250	50	
64	Item 64 Description	3250	3350	3300	50	
65	Item 65 Description	3300	3400	3350	50	
66	Item 66 Description	3350	3450	3400	50	
67	Item 67 Description	3400	3500	3450	50	
68	Item 68 Description	3450	3550	3500	50	
69	Item 69 Description	3500	3600	3550	50	
70	Item 70 Description	3550	3650	3600	50	
71	Item 71 Description	3600	3700	3650	50	
72	Item 72 Description	3650	3750	3700	50	
73	Item 73 Description	3700	3800	3750	50	
74	Item 74 Description	3750	3850	3800	50	
75	Item 75 Description	3800	3900	3850	50	
76	Item 76 Description	3850	3950	3900	50	
77	Item 77 Description	3900	4000	3950	50	
78	Item 78 Description	3950	4050	4000	50	
79	Item 79 Description	4000	4100	4050	50	
80	Item 80 Description	4050	4150	4100	50	
81	Item 81 Description	4100	4200	4150	50	
82	Item 82 Description	4150	4250	4200	50	
83	Item 83 Description	4200	4300	4250	50	
84	Item 84 Description	4250	4350	4300	50	
85	Item 85 Description	4300	4400	4350	50	
86	Item 86 Description	4350	4450	4400	50	
87	Item 87 Description	4400	4500	4450	50	
88	Item 88 Description	4450	4550	4500	50	
89	Item 89 Description	4500	4600	4550	50	
90	Item 90 Description	4550	4650	4600	50	
91	Item 91 Description	4600	4700	4650	50	
92	Item 92 Description	4650	4750	4700	50	
93	Item 93 Description	4700	4800	4750	50	
94	Item 94 Description	4750	4850	4800	50	
95	Item 95 Description	4800	4900	4850	50	
96	Item 96 Description	4850	4950	4900	50	
97	Item 97 Description	4900	5000	4950	50	
98	Item 98 Description	4950	5050	5000	50	
99	Item 99 Description	5000	5100	5050	50	
100	Item 100 Description	5050	5150	5100	50	

Table 1. (Continued)

Book	Telephotography Radio Phone		Wireless Radio Transmission		Radio Reception	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	94	2	90	17.5	97	18
B	-	-	-	-	-	-
C	-	-	92	11	93	5
D	-	-	-	-	-	-
E	-	-	35	8.5	37	11
F	-	-	-	-	85	5
G	-	-	-	-	-	-
H	-	-	-	-	77	6
I	-	-	-	-	-	-
J	-	-	41	2.5	-	-
K	-	-	62	7	58	18.5
L	-	-	18	0.25	-	-
M	-	-	-	-	-	-
N	-	-	-	-	-	-
O	60	3	54	4	55	18
Approximate Average Pages		0.25		3.5		5.
Range of Pages		0 - 3		0-17.5		0-18.5
Number of Books Included Item	2		7		7	
Median Relative Position	-		-		-	
Relative Position of Item, Based on Median	-		-		-	

Project Information		Financial Summary		Operational Data		Notes
ID	Name	Budget	Actual	Units	Hours	
P001	Project Alpha	10000	9500	1500	1200	Completed on time
P002	Project Beta	8000	8200	1200	1000	Minor delays
P003	Project Gamma	12000	11800	1800	1500	On track
P004	Project Delta	9000	9100	1400	1100	On track
P005	Project Epsilon	11000	10500	1600	1300	On track
P006	Project Zeta	7000	7200	1000	800	On track
P007	Project Eta	13000	12800	2000	1600	On track
P008	Project Theta	6000	6100	800	600	On track
P009	Project Iota	14000	13500	2200	1800	On track
P010	Project Kappa	5000	5200	600	500	On track

Table 1. (Continued)

Book	Television		Arc Lamps Arcs		Gaseous Conduction Ionization	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	-	-	48	3	73	10
B	74	2	74	4.5	94	3.5
C	-	-	80	3.5	-	-
D	-	-	-	-	-	-
E	38	11	-	-	-	-
F	-	-	81	2	-	-
G	-	-	-	-	-	-
H	-	-	-	-	-	-
I	-	-	-	-	-	-
J	-	-	28	3	-	-
K	-	-	-	-	-	-
L	-	-	32	4	-	-
M	-	-	-	-	-	-
N	-	-	-	-	-	-
O	-	-	-	-	-	-
Approximate Average Pages		1		1.5		1
Range of Pages		0 - 11		0 - 4.5		0 - 10
Number of Books Included Item	2		6		2	
Median Relative Position	-		-		-	
Relative Position of Item, Based on Median	-		-		-	

Date	Project Name		Project Location		Project Status	Project Manager
	Project Name	Project Location	Project Name	Project Location		
2023-01-01	Project A	Location A	Project B	Location B	Completed	John Doe
2023-01-02	Project A	Location A	Project B	Location B	In Progress	John Doe
2023-01-03	Project A	Location A	Project B	Location B	On Hold	John Doe
2023-01-04	Project A	Location A	Project B	Location B	Completed	John Doe
2023-01-05	Project A	Location A	Project B	Location B	In Progress	John Doe
2023-01-06	Project A	Location A	Project B	Location B	On Hold	John Doe
2023-01-07	Project A	Location A	Project B	Location B	Completed	John Doe
2023-01-08	Project A	Location A	Project B	Location B	In Progress	John Doe
2023-01-09	Project A	Location A	Project B	Location B	On Hold	John Doe
2023-01-10	Project A	Location A	Project B	Location B	Completed	John Doe
2023-01-11	Project A	Location A	Project B	Location B	In Progress	John Doe
2023-01-12	Project A	Location A	Project B	Location B	On Hold	John Doe
2023-01-13	Project A	Location A	Project B	Location B	Completed	John Doe
2023-01-14	Project A	Location A	Project B	Location B	In Progress	John Doe
2023-01-15	Project A	Location A	Project B	Location B	On Hold	John Doe
2023-01-16	Project A	Location A	Project B	Location B	Completed	John Doe
2023-01-17	Project A	Location A	Project B	Location B	In Progress	John Doe
2023-01-18	Project A	Location A	Project B	Location B	On Hold	John Doe
2023-01-19	Project A	Location A	Project B	Location B	Completed	John Doe
2023-01-20	Project A	Location A	Project B	Location B	In Progress	John Doe
2023-01-21	Project A	Location A	Project B	Location B	On Hold	John Doe
2023-01-22	Project A	Location A	Project B	Location B	Completed	John Doe
2023-01-23	Project A	Location A	Project B	Location B	In Progress	John Doe
2023-01-24	Project A	Location A	Project B	Location B	On Hold	John Doe
2023-01-25	Project A	Location A	Project B	Location B	Completed	John Doe
2023-01-26	Project A	Location A	Project B	Location B	In Progress	John Doe
2023-01-27	Project A	Location A	Project B	Location B	On Hold	John Doe
2023-01-28	Project A	Location A	Project B	Location B	Completed	John Doe
2023-01-29	Project A	Location A	Project B	Location B	In Progress	John Doe
2023-01-30	Project A	Location A	Project B	Location B	On Hold	John Doe
2023-01-31	Project A	Location A	Project B	Location B	Completed	John Doe

Table 1. (Continued)

Book	Corona		Incandescent Lamp Lighting		Mercury Vapor and Vapor Lamps	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	97	1	47	6	46	2
B	76	1	-	-	-	-
C	-	-	79	10	81	1
D	-	-	-	-	-	-
E	-	-	33	8.5	-	-
F	-	-	80	1.25	-	-
G	-	-	-	-	-	-
H	-	-	-	-	-	-
I	-	-	-	-	-	-
J	-	-	27	12	29	2.5
K	-	-	54	1	-	-
L	-	-	31	8	-	-
M	-	-	-	-	-	-
N	-	-	46	1	-	-
O	-	-	49	11	-	-
Approximate Average Pages		-		4		0.5
Range of Pages		0 - 1		0 - 11		0 - 2.5
Number of Books Included Item	2		9		3	
Median Relative Position	-		77.5		-	
Relative Position of Item, Based on Median	-		LX		-	

Project Information		Financial Summary		Operational Data		Notes
Project ID	Project Name	Budget (USD)	Actual Cost (USD)	Units Produced	Units Sold	
P001	Project Alpha	10000	9500	1000	900	Completed on time
P002	Project Beta	15000	16000	1200	1100	Over budget
P003	Project Gamma	20000	19000	1500	1400	On track
P004	Project Delta	25000	26000	1800	1700	Minor delays
P005	Project Epsilon	30000	29000	2000	1900	Good progress
P006	Project Zeta	35000	36000	2200	2100	Watch for costs
P007	Project Eta	40000	39000	2500	2400	Steady growth
P008	Project Theta	45000	46000	2800	2700	Review scope
P009	Project Iota	50000	49000	3000	2900	Excellent results
P010	Project Kappa	55000	56000	3200	3100	Minor issues
P011	Project Lambda	60000	59000	3500	3400	On schedule
P012	Project Mu	65000	66000	3800	3700	Costs rising
P013	Project Nu	70000	69000	4000	3900	Good control
P014	Project Xi	75000	76000	4200	4100	Monitor quality
P015	Project Omicron	80000	79000	4500	4400	Final review
P016	Project Pi	85000	86000	4800	4700	Minor delays
P017	Project Rho	90000	89000	5000	4900	On track
P018	Project Sigma	95000	96000	5200	5100	Watch for costs
P019	Project Tau	100000	99000	5500	5400	Good progress
P020	Project Upsilon	105000	106000	5800	5700	Review scope
P021	Project Phi	110000	109000	6000	5900	Excellent results
P022	Project Chi	115000	116000	6200	6100	Minor issues
P023	Project Psi	120000	119000	6500	6400	On schedule
P024	Project Omega	125000	126000	6800	6700	Costs rising
P025	Project A	130000	129000	7000	6900	Good control
P026	Project B	135000	136000	7200	7100	Monitor quality
P027	Project C	140000	139000	7500	7400	Final review
P028	Project D	145000	146000	7800	7700	Minor delays
P029	Project E	150000	149000	8000	7900	On track
P030	Project F	155000	156000	8200	8100	Watch for costs
P031	Project G	160000	159000	8500	8400	Good progress
P032	Project H	165000	166000	8800	8700	Review scope
P033	Project I	170000	169000	9000	8900	Excellent results
P034	Project J	175000	176000	9200	9100	Minor issues
P035	Project K	180000	179000	9500	9400	On schedule
P036	Project L	185000	186000	9800	9700	Costs rising
P037	Project M	190000	189000	10000	9900	Good control
P038	Project N	195000	196000	10200	10100	Monitor quality
P039	Project O	200000	199000	10500	10400	Final review
P040	Project P	205000	206000	10800	10700	Minor delays
P041	Project Q	210000	209000	11000	10900	On track
P042	Project R	215000	216000	11200	11100	Watch for costs
P043	Project S	220000	219000	11500	11400	Good progress
P044	Project T	225000	226000	11800	11700	Review scope
P045	Project U	230000	229000	12000	11900	Excellent results
P046	Project V	235000	236000	12200	12100	Minor issues
P047	Project W	240000	239000	12500	12400	On schedule
P048	Project X	245000	246000	12800	12700	Costs rising
P049	Project Y	250000	249000	13000	12900	Good control
P050	Project Z	255000	256000	13200	13100	Monitor quality

Table 1. (Continued)

Book	Illumination		Circuit Breaker		Elevators, Clocks Locomotives, Auto- mobiles, Ships, Household Apparatus	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	48	3	28	1	-	-
B	-	-	28	-	88	20
C	82	11	84	1	-	-
D	-	-	-	-	-	-
E	-	-	-	-	-	-
F	79	6.5	52	1	-	-
G	-	-	-	-	-	-
H	-	-	23	1	-	-
I	-	-	-	-	46	)1*)2
J	-	-	-	-	-	-
K	-	-	-	-	-	-
L	-	-	-	-	-	-
M	-	-	45	0.25	-	-
N	-	-	-	-	-	-
O	50	24	-	-	42	9*
Approximate Average Pages		3		0.25		1.5
Range of Pages		0 - 24		0 - 1		0 - 20
Number of Books Included Item	4		6		3	
Median Relative Position	-		-		-	
Relative Position of Item, Based on Median	-		-		-	

*Household devices, such as flat iron.

Project Information		Project Details		Financial Summary		Notes
Project Name	Project ID	Start Date	End Date	Budget	Actual Cost	
Project A	101	2023-01-01	2023-03-31	\$100,000	\$95,000	Completed successfully.
Project B	102	2023-04-01	2023-06-30	\$150,000	\$155,000	Over budget due to scope creep.
Project C	103	2023-07-01	2023-09-30	\$80,000	\$78,000	On track.
Project D	104	2023-10-01	2023-12-31	\$120,000	\$110,000	Minor delays, but within budget.
Total Projects		Total Duration		Total Budget	Total Actual Cost	Overall Status
4 Projects		12 Months		\$450,000	\$438,000	Good

Table 1. (Concluded)

Book	Electro-Magnetic Waves Waves		Introduction to Radio	
	Relative Position of Item	Number Pages Each Item	Relative Position of Item	Number Pages Each Item
A	95	7	-	-
B	-	-	-	-
C	90	12.5	-	-
D	-	-	-	-
E	-	-	34	10
F	-	-	-	-
G	-	-	-	-
H	-	-	76	4.5
I	-	-	-	-
J	40	-	43	1
K	63	6.5	60	1
L	-	-	-	-
M	-	-	-	-
N	-	-	-	-
O	53	3	51	4.5
Approximate Average Pages		2		1.5
Range of Pages		0 - 12.5		0 - 10
Number of Books Included Item	5		5	
Median Relative Position	-		-	
Relative Position of Item, Based on Median	-		-	

Problem 1.1		Problem 1.2		Notes
Given	Find	Given	Find	
1.1.1	1.1.2	1.2.1	1.2.2	1.1.3
1.1.4	1.1.5	1.2.3	1.2.4	1.1.4
1.1.6	1.1.7	1.2.5	1.2.6	1.1.5
1.1.8	1.1.9	1.2.7	1.2.8	1.1.6
1.1.10	1.1.11	1.2.9	1.2.10	1.1.7
1.1.12	1.1.13	1.2.11	1.2.12	1.1.8
1.1.14	1.1.15	1.2.13	1.2.14	1.1.9
1.1.16	1.1.17	1.2.15	1.2.16	1.1.10
1.1.18	1.1.19	1.2.17	1.2.18	1.1.11
1.1.20	1.1.21	1.2.19	1.2.20	1.1.12
1.1.22	1.1.23	1.2.21	1.2.22	1.1.13
1.1.24	1.1.25	1.2.23	1.2.24	1.1.14
1.1.26	1.1.27	1.2.25	1.2.26	1.1.15
1.1.28	1.1.29	1.2.27	1.2.28	1.1.16
1.1.30	1.1.31	1.2.29	1.2.30	1.1.17
1.1.32	1.1.33	1.2.31	1.2.32	1.1.18
1.1.34	1.1.35	1.2.33	1.2.34	1.1.19
1.1.36	1.1.37	1.2.35	1.2.36	1.1.20
1.1.38	1.1.39	1.2.37	1.2.38	1.1.21
1.1.40	1.1.41	1.2.39	1.2.40	1.1.22
1.1.42	1.1.43	1.2.41	1.2.42	1.1.23
1.1.44	1.1.45	1.2.43	1.2.44	1.1.24
1.1.46	1.1.47	1.2.45	1.2.46	1.1.25
1.1.48	1.1.49	1.2.47	1.2.48	1.1.26
1.1.50	1.1.51	1.2.49	1.2.50	1.1.27
1.1.52	1.1.53	1.2.51	1.2.52	1.1.28
1.1.54	1.1.55	1.2.53	1.2.54	1.1.29
1.1.56	1.1.57	1.2.55	1.2.56	1.1.30
1.1.58	1.1.59	1.2.57	1.2.58	1.1.31
1.1.60	1.1.61	1.2.59	1.2.60	1.1.32
1.1.62	1.1.63	1.2.61	1.2.62	1.1.33
1.1.64	1.1.65	1.2.63	1.2.64	1.1.34
1.1.66	1.1.67	1.2.65	1.2.66	1.1.35
1.1.68	1.1.69	1.2.67	1.2.68	1.1.36
1.1.70	1.1.71	1.2.69	1.2.70	1.1.37
1.1.72	1.1.73	1.2.71	1.2.72	1.1.38
1.1.74	1.1.75	1.2.73	1.2.74	1.1.39
1.1.76	1.1.77	1.2.75	1.2.76	1.1.40
1.1.78	1.1.79	1.2.77	1.2.78	1.1.41
1.1.80	1.1.81	1.2.79	1.2.80	1.1.42
1.1.82	1.1.83	1.2.81	1.2.82	1.1.43
1.1.84	1.1.85	1.2.83	1.2.84	1.1.44
1.1.86	1.1.87	1.2.85	1.2.86	1.1.45
1.1.88	1.1.89	1.2.87	1.2.88	1.1.46
1.1.90	1.1.91	1.2.89	1.2.90	1.1.47
1.1.92	1.1.93	1.2.91	1.2.92	1.1.48
1.1.94	1.1.95	1.2.93	1.2.94	1.1.49
1.1.96	1.1.97	1.2.95	1.2.96	1.1.50
1.1.98	1.1.99	1.2.97	1.2.98	1.1.51
1.1.100	1.1.101	1.2.99	1.2.100	1.1.52

The following table, Table 2, gives the order of items and the number of pages devoted to each, based on the median of the item and the mean of the pages of the fifteen books analyzed, as shown at the bottom of the page in Table 1, beginning on page 9.

For example, reading the first line across in Table 2, "I" indicates that the first topic discussed, based on information obtained as stated in the above paragraph, is, "Introduction to Electricity." The pages devoted to this topic are 5.25.

Reading the last line across in this table, "Synchronous Motors" is the sixty-fourth topic discussed, and the space devoted to it was 2 pages.

Table 2. Order of Topics and Number of Pages Devoted to Each, Based on Median of Items and Mean of Pages as Indicated in Table 1.

Order	Number of Pages	Title
I	5.25	Introduction to Electricity.
II	4.5	Permanent Magnets and Magnets.
III	7.25	Primary Cells.
IV	2.5	Conductance. Resistance.
V	7.	Magnetism.
VI	1.	Volts.
VII	2.25	Amperes and Current. Measure Current.
VIII	4.5	Voltaic Cell. Simple Electric Cell. Electro-Chemistry.
IX	1.	Electro Motive Force. Potential.
X	0.25	Coulomb.
XI	3.75	Ohm. Ohm's Law.
XII	1.5	Conductors. Insulators.
XIII	6.25	Energy. Kilo-watt. Watt. Horse Power K.W.H.
XIV	2.5	Series Circuit.
XV	4.5	Battery Connections. Ohm's Law for Batteries.
XVI	2.	Heating Effect of a Current.
XVII	3.25	Parallel Circuits.
XVIII	4.	Magnetic Effect of a Current. Electro Magnetic. Electro Magnetism.

Table 2. (Continued)

Order	Number of Pages	Title
XIX	4.75	Solenoid Electro Magnet.
XX	3.75	Ammeters. Milli-Ammeters.
XXI	1.75	Volts Drop. Line Drop. Measure Volts
XXII	4.25	Circular Mil. Resistance of a Wire. Wires.
XXIII	3.75	Bells. Signalling Devices. Bell Wiring.
XXIV	12.	Storage Battery.
XXV	2.	Voltmeter. Milli-Voltmeter.
XXVI	4.5	Telegraphy.
XXVII	1.75	Heating Effect of Current. Capacity of Wire. Tables.
XXVIII	5.25	Electro Magnetic Induction. Lenz's Law.
XXIX	2.	Galvanometer.
XXX	5.25	Static Electricity. Electro Static. Electric Charges.
XXXI	3.	Electron Theory.
XXXII	5.75	Electro Dynamics. Introduction to Motors.
XXXIII	1.25	Fuses.
XXXIV	4.	Induction Coil.
XXXV	0.75	Measure Resistance with Voltmeter and Ammeter.
XXXVI	14.5	Generator. D.C. Generator.
XXXVII	6.5	Magnetic Circuits and Windings.
XXXVIII	3.5	Chemical Effects of a Current. Electroplating.
XXXIX	3.5	Dynamo D.C. Machinery.
XL	2.5	Watt Hour Meter. Calculate Cost from Readings.
XLI	13.5	D.C. Motors, Starters and Switches.
XLII	2.25	Heating Devices.
XLIII	6.25	Introduction to A.C.
XLIV	10.5	Transformers.
XLV	0.75	Efficiency.
XLVI	3.25	Self Induction.
XLVII	4.	A.C. Alternator or A.C. Generator.
XLVIII	1.5	Auto Ignition and Auto Systems.
XLIX	2.5	Inductive Resistance. Henry.
L	5.5	Telephone and Systems.
LI	5.	Condensers. Capacitance.
LII	1.	Watt Meters.

Table 2. (Concluded)

Order	Number of Pages	Title
LIII	0.75	Eddy Currents.
LIV	2.5	Polly Phase Circuits and Systems.
LV	3.25	Three Wire Systems, Single Phase, or D.C.
LVI	4.	Impedence in Series Circuits.
LVII	5.75	Interior Wiring. House Wiring. Wiring Devices.
LVIII	0.75	Polly Phase Motors and Starters.
LIX	2.25	Single Phase Motors.
LX	4.	Incandescent Lamps. Lighting.
LXI	6.25	Power Stations. Distribution of Power. Transmission Power.
LXII	5.5	Radio Tubes. Vacuum Tubes and Applications.
LXIII	2.25	Rectifiers.
LXIV	2.	Synchronous Motors.

DISCUSSION OF FINDINGS AS INDICATED IN TABLES 1 AND 2

In the original analysis the writer had one hundred and thirteen items, selected with no thought of arrangement according to importance and with no attempt to include only fundamentals. However, after the median of all items and the mean of pages devoted to each item had been found, it was expected that the answers to these five questions could be arrived at:

1. What are the fundamentals of electricity?
2. What are the apparatus, devices, machines, etc., used either because of aid in presentation of fundamentals or used so commonly by everyone that anyone with a knowledge of electricity should understand them?
3. What is the order in which questions 1 and 2 should be discussed?
4. What is the amount of space which should be devoted to questions 1 and 2?

5. What are the items which should be eliminated from the book, but which were considered important by an individual author?

The next point to be considered was to what extent the analysis had aided in finding things which should be accomplished. A person would be inclined to accept the opinions of the majority of the fifteen authors as to what should be included in a text, but findings are not to be interpreted as the answers to the five questions previously stated of what a book should contain, until the items are scrutinized very closely.

Consider first Item III,^{1/} "Primary Cells." This includes "dry cells" and "wet cells." There is nothing in a textbook on this subject^{2/} that would indicate that primary cells can be classed as fundamentals. They are increasingly unimportant sources of electrical energy. A knowledge of them is not essential to instruction. In the Rindge Technical High School in Cambridge, Massachusetts, there is not one primary cell used in any of the twenty laboratories devoted to the study of science, physics, chemistry and electricity. A few years ago they were the chief source of energy for experimental purposes. The use of primary cells in almost every field in which they were used formerly has decreased enormously. From 1923 to 1929 the number of batteries produced for radio use alone was 387,345,863.^{3/} The invention of all-electric radios since that time has eliminated that battery field almost entirely. The chief use of the dry battery now is in the flash

^{1/} See Table 2, p.47.

^{2/} Park, Benjamin, Electric Batteries.

^{3/} Fifteenth Census of U.S. Manufactures, 1929, XX, Table 8, p.1128.

light.^{1/} Therefore, common sense prevents a lengthy discussion in a book, of anything as simple as this type of battery.

Western Union used "wet batteries" extensively until recently, but today they use very few.^{2/}

Further proof that primary batteries are no longer an essential source of energy is contained in two letters received by the writer from very reliable sources.^{3/} These may be found in the appendix.

Sufficient evidence has been given to show that a study of the primary cell should not occupy a prominent space in a book, nor should a mean of seven pages be devoted to it. Maintenance, installation, and uses are all that are necessary to know concerning primary cells.

There is no argument that can be used to justify the treatment of item VIII (Voltaic Cell - 4.5 pages) in any electricity book. This is included in practically every physics book.^{4/} It is really an introduction to item III (Primary Cells), which has just been discussed.

The next item the writer will consider is item XXIV (Storage Battery).

1/ Fifteenth Census of U.S. Manufactures, 1929, XX, Table 8, p.1128.

2/ Personal letters from J.H.Groves, Superintendent, Western Union Telegraph Co., dated April 1 and 13, 1938.

Personal letter from H.Burkland, Manager, Bryant Mfg. Co., dated March 24, 1938.

3/ Personal letter from E.Val Wetmore, Manager, Wetmore Savage Co., dated April 2, 1938.

Personal letter from A.A.Church, in charge of N.E. Signal Sales Division of Holtzer-Cabot Co., dated April 7, 1938.

4/ Black and Davis, Practical Physics, p.262-269.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the transparency and accountability of the organization. This section also outlines the various methods used to collect and analyze data, ensuring that the information is reliable and up-to-date.

2. The second part of the document focuses on the financial aspects of the organization. It provides a detailed overview of the budget, including the projected income and expenses for the upcoming year. This section also discusses the various financial risks and how they are being managed to ensure the organization's financial stability.

3. The third part of the document addresses the operational aspects of the organization. It describes the various processes and procedures that are in place to ensure the efficient and effective delivery of services. This section also discusses the various challenges that the organization is facing and how they are being addressed.

4. The fourth part of the document discusses the human resources aspect of the organization. It provides an overview of the current staff levels and the various training and development programs that are in place. This section also discusses the various challenges that the organization is facing in terms of recruitment and retention of staff.

5. The fifth part of the document discusses the marketing and public relations aspect of the organization. It provides an overview of the various marketing and public relations strategies that are in place to promote the organization's services. This section also discusses the various challenges that the organization is facing in terms of reaching its target audience.

6. The sixth part of the document discusses the legal and regulatory aspects of the organization. It provides an overview of the various laws and regulations that the organization is subject to and how they are being managed. This section also discusses the various challenges that the organization is facing in terms of compliance with these laws and regulations.

7. The seventh part of the document discusses the environmental and social aspects of the organization. It provides an overview of the various environmental and social issues that the organization is facing and how they are being addressed. This section also discusses the various challenges that the organization is facing in terms of managing these issues.

8. The eighth part of the document discusses the overall performance of the organization. It provides an overview of the various key performance indicators (KPIs) that are being used to measure the organization's performance. This section also discusses the various challenges that the organization is facing in terms of improving its performance.

9. The ninth part of the document discusses the future of the organization. It provides an overview of the various strategic goals that the organization is pursuing and how they are being implemented. This section also discusses the various challenges that the organization is facing in terms of achieving these goals.

10. The tenth part of the document discusses the conclusion of the report. It summarizes the key findings of the report and provides recommendations for the future. This section also discusses the various challenges that the organization is facing in terms of implementing these recommendations.

This comes twenty-fourth on the list,^{1/} and it is discussed in all fifteen books. Its range is from 2.5 to 42.5 pages and it has a mean of 12 pages. The United States Bureau of Census shows that production was valued at approximately \$46,000,000. for 1935 and about one-fifth of this amount was used for motor vehicles. The writer's investigation of the uses of the storage battery has shown that its use is increasing rapidly and that it is extensively employed in telephone,^{2/} telegraph,^{3/} railroad signalling,^{4/} and United States Government Marine work.^{5/}

Regardless of the fact that its use is increasing, as shown by this data, the writer contends that the storage battery is placed too prominently in the list and that too much space is devoted to it, because a discussion of it cannot be classed as fundamental, nor as an aid in presenting a fundamental.

Too much stress is laid on chemical action and repairing. The former belongs to the field of chemistry ^{6/} and the latter is being replaced by the "exchange plan." In the classified section of the Boston telephone directory the writer found the advertisement of only one company that men-

^{1/} See Table 2, p.48.

^{2/} Personal Letter from F.A.Shurtleff, Manager of New England Telephone and Telegraph Co., dated April 4, 1938.

^{3/} Personal Letter from J.H.Groves, Superintendent of Western Union Telegraph Co., dated April 13, 1938.

^{4/} Personal Letter from H.F.Brown, Chairman of Association of American Railroads, dated April 5, 1938.

^{5/} Personal Letter from E.H.Evans, Sales Promotion Manager of Willard Storage Battery Company, dated April 6, 1938.

^{6/} Norris, James F., Inorganic Chemistry, p.486-496.

tioned battery repairing. A reference to a good text ^{1/} on the subject and a suggestion that the reader write to any of the leading manufacturers of storage batteries ^{2/} for a pamphlet on instructions (the Electric Storage Battery Company of Philadelphia has a very fine one), together with a few pages of general information are all that is needed. There are changes being made in storage battery construction, and a book that goes too much into detail is liable soon to become obsolete. The writer did not find in any of the fifteen books a reference to the "Low Discharge Storage Battery" ^{3/} that is now being used so extensively in many fields.

This item on storage batteries was discussed to show that the position of an item or the amount of space devoted to it should not be based on the number of practical apparatus used or their commercial value, but on the value of the item as a fundamental and as a tool to aid in the presentation of principles involved in the fundamental.

The next item to be discussed, number XXVI (Telegraphy) ^{4/} is a typical example of obsolete material in a textbook which is retained, no doubt, because of its historical value.^{5/} Telegraphy, in 1844, created the first commercial use for electricity,^{6/} but Western Union and many railroads have

^{1/} Morton, Ardent, Storage Battery.

^{2/} Buyers Reference Number, Electrical World, Part II (1937), p.15.

^{3/} Low Discharge Battery, Willard Storage Battery Company.

^{4/} See Table 2, p.48.

^{5/} Thompson, S.P., Electricity and Magnetism, p.393-403.

^{6/} Morgan, Alfred, A First Electricity Book, p.67.

discontinued the use of the telegraphic instrument.^{1/}

By consulting item L (Telephone) in Table 1 it can be seen readily that this is over-emphasized. There has been such a radical change in telephone apparatus in the past few years that it is absurd to give the subject, in an elementary text, anything more than passing notice, regardless of the fact that many apartments still use the old type of telephone. A glance at a text written twelve years ago ^{2/} and at one of recent date ^{3/} will prove this contention. The science of the telephone is a highly specialized field and one has only to visit the New England Telephone and Telegraph Company's station on Ware Street, Cambridge, Massachusetts, to be convinced of this.

The original items were reduced from one hundred and thirteen to sixty-four ^{4/} and the question arises as to whether or not the items eliminated were of no real value in a textbook.

A close scrutiny of Table 1 shows that there are included in the discarded list ^{5/} some items that should not have been omitted. The writer refers to the circuit breaker as an example. Only six authors mentioned it, and the mean of pages devoted to it is only 0.3. This lack of emphasis is due to recent developments that have been made in this device. Until re-

^{1/} Personal letters from J.H.Groves, Superintendent of Western Union Telegraph Co., dated April 1 and 13, 1938.

^{2/} Jansky and Faber, Principles of Telephone, Part I, p.160.

^{3/} Smith and Campbell, Automatic Telephone.

^{4/} See Table 2, p.47-49.

^{5/} Those items in Table 1, p.9-46, for which there is no "Relative Position Based on Median" given.

September 18, 1900

Dear Mr. [Name],

I have just received your letter of the 17th inst. and am glad to hear from you. I am well and hope this finds you the same. I have been thinking of you very much lately and wondering how you are getting on. I hope you are well and happy. I have been very busy lately, but I have managed to find some time to write to you. I have been thinking of you very much lately and wondering how you are getting on. I hope you are well and happy. I have been very busy lately, but I have managed to find some time to write to you.

I have been thinking of you very much lately and wondering how you are getting on. I hope you are well and happy. I have been very busy lately, but I have managed to find some time to write to you. I have been thinking of you very much lately and wondering how you are getting on. I hope you are well and happy. I have been very busy lately, but I have managed to find some time to write to you.

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cently fuses had to be used to protect circuits in homes, in offices, and in experimental laboratories, but now they may be replaced by circuit breakers.^{1/} Hence this device becomes a very vital piece of apparatus in the electrical field, especially in the home. Therefore it should be discussed at length.

The contents of an electricity book in a broad sense deal with two general topics: direct current and alternating current. The early developments were in direct current, but from the opening of the first generating plant ^{2/} to this day the trend has been towards the use of alternating current. However, elementary textbooks, with almost no exception, have devoted much more of their contents to a discussion of direct current. The only excuse given is that a knowledge of direct current is advisable as a basis for the study of alternating current.^{3/} Even so, there is no reason why textbooks should devote most of their attention to that which is basic. The index of a recent electrical engineering book ^{4/} has one line for direct current as compared with seven lines for alternating current. Again, in another book ^{5/} one hundred and six index references were found under

1/ General Electric Branch Circuit Breaker, MD-3.7, p.1-3.
Westinghouse Nofag Multi-Breaker, Cat. 29-300.

2/ First electrical generating station was opened in 1882, Public Utility Service, 1927.

3/ Personal letter from G.F.Wittig, Statistical Editor of Electrical World, dated April 12, 1938.

Personal letter from Chester L. Dawes, Associate Professor, Harvard University, dated April 20, 1938.

4/ Eshbach, Handbook of Engineering.

5/ Electric Engineering Handbook, Electric Power, Part IV.

headings referring to alternating current, while under headings referring to direct current, there were merely thirty-eight. The authors of elementary textbooks have failed to follow the example of writers of electrical engineering texts.

Only about three per cent ^{1/} of the energy (120,996,000,000 kilowatt hours) ^{2/} generated in this country is done so by direct current, and of the energy used only about ten per cent is direct current.^{3/} The trend in railroading in the past few years has been away from direct current and toward alternating current.^{4/} The New England Power Association sold only 0.3 per cent of its 1,971,331,997 kilowatt hour output in 1937 as direct current.^{5/} The Philadelphia Electric Company discontinued its supply of direct current to its customers in October, 1935.^{6/} In Cambridge, Massachusetts, only alternating current is supplied to consumers, and Boston proper, which was formerly on direct current, is changing rapidly to alternating current. No figures were obtainable from the Edison Electric Company of Boston, but the writer knows that direct current represents but a

^{1/} Personal letter from William M. Carpenter, Economist, Edison Electric Institute, dated April 2, 1938.

^{2/} Federal Power Commission Report on Production of Electricity, Release Number 366.

^{3/} Personal letter from William M. Carpenter, Economist, Edison Electric Institute, dated April 2, 1938.

^{4/} Personal letter from H.F. Brown, Chairman, Association of American Railroads, dated April 5, 1938.

^{5/} Personal letter from H. Hanson, Treasurer, New England Power Association, dated April 11, 1938

^{6/} Personal letter from H.B. Bryans, Vice President, Philadelphia Electric Company, dated March 29, 1938.

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small percentage of its total load. The vast majority of this company's customers are supplied with alternating current.

The United States Navy, prior to 1934, used direct current exclusively for lighting and for auxiliary equipment on ships. All the seventy-seven ships built since that date have the alternating current system of miscellaneous and auxiliary electrification.^{1/}

The writer believes he has given data enough to prove that the fifteen books read, in which emphasis as shown in Tables 1 and 2 was decidedly on direct current, were wrong in their proportion of space and items devoted to direct current as against that devoted to alternating current.

The writer stated at the beginning of this thesis that an electricity textbook should emphasize not just any device that is familiar to the author, but only those devices and apparatus that are in common, everyday use. The textbooks analyzed, as shown in Table 1 under the heading of heating devices and household apparatus (included under heading with elevators, etc.) have placed very little emphasis on these. This is a grave mistake. Books on electrical apparatus and appliances,^{2/} and authorities on the subject reveal their importance,^{3/} as does also a study of the following data.

In 1937 there were more than 26,000,000 customers in the United States

^{1/} General Electric Company, Studies in Engineering, Number 208, p.6.

^{2/} Gay, C.M., Electric Apparatus and Appliances.

^{3/} Muir, R.C., Some Engineering Contributions to Society, p.1-11.

that had electrical service.^{1/} Approximately 900,000 of these were farm dwellers and approximately 21,000,000 were residential consumers.^{2/} These figures show that it would be much more sensible to give more attention to electrical equipment used by those customers, who comprise eighty-four per cent of the total, and less to equipment that is used only in connection with highly specialized fields, such as X-ray work, power station equipment and the like.

A study of the use of appliances reveals that for the year 1937 ^{3/} fifteen different classes of electrical appliances were being operated for domestic purposes, and that the total number of the same in use was 11,454,175,000.^{4/} Such a universal use of appliances calls for far more attention to their construction, installation, maintenance and safety in elementary textbooks than is given now.

The question here arises as to whether or not a text should include a discussion of safety against electrical hazards. If the author were guided by the opinion of the majority of the writers of the books analyzed, he would omit it. Here again this writer disagrees. The many rules and regulations and the many articles written about the subject are indications of its importance. The National Board of Fire Underwriters publishes a book ^{5/}

^{1/} Federal Power Commission and Its Work, 1933-1937.

^{2/} Edison Electric Institute Bulletin, Number 4 (January, 1937), The Electric Light and Power Industry in the United States, p.40-42.

^{3/} Loc. cit.

^{4/} Edison Electric Institute, Energy Used by Domestic Appliances.

^{5/} National Board of Fire Underwriters, National Electric Code, 1937, p.334.

of regulations for electrical wiring and apparatus, and an intimate knowledge of its contents is required by every state before an electrician's license is issued to him. Yet only six authors referred to this topic, and the average space devoted to it was one-quarter of a page. Dr. Copeland's article, "Shocks from Electricity Serious," which appeared in the Boston Evening American, March 25, 1938, is a very convincing argument for the adoption of safety as an essential topic to be included in an electricity book.

"As civilization has advanced more and more, hazards and dangers to life have appeared.

"We recognize the great mechanical and social advantages of electricity. But in a recent publication of an insurance company, it is pointed out that electricity was responsible in 1934 for more than 600 deaths in the United States.

"It is true that many of these fatalities occurred among electrical linemen, electricians and workers engaged in installing high power machinery. Some were caused by electric burns. Some involved high voltage exposure. Others occurred as a result of contact with the ordinary household current. There is a universal belief that the low voltage so commonly found in homes is not dangerous. The ordinary household current of 100 to 110 volts is not in itself a dangerous current. But occasionally it may be of sufficient intensity to cause severe damage to the heart and produce instant death.

"TO MANY CARELESS

"Many of these accidents could have been avoided. Too many persons are careless about the handling of electrical appliances. It is customary to assume that electrical equipment is always in perfect order. But we must not overlook the fact that with constant use wires become frayed and damaged. Conditions result which are capable of producing short circuits, and these make the appliance dangerous and prepare the way for electric shock.

"It is unwise to handle electrical equipment while the hands or other parts of the body are wet. A dry skin serves as a barrier against the electrical current. But a moist skin lowers this resistance and a wet skin acts as an excellent conductor.

"Many deaths have been reported of persons who received fatal shocks in handling electrical apparatus, while in the bathtub or before drying. I am glad to say that definite efforts are now being made to prevent these deaths. But emphasizing the danger, the public is coming to realize the importance of caution.

"Electrical appliances should be checked and serviced by licensed electricians. This practice will increase the life of the appliances and prevent conditions favorable to direct contacts with the current."

Good books and articles to read in guiding an author as to what should be included in a text on this subject of safety are the following: Injury from Electricity,^{1/} Don'ts for Electrical Pupils,^{2/} Electricity and Fire Risk,^{3/} Industrial Code of Department of Vocational Education,^{4/} Resuscitation,^{5/} Electrical Injuries,^{6/} Safety for the Household.^{7/}

A critical analysis, such as is given in this discussion of ten items selected from Tables 1 and 2, should be made of all one hundred and thirteen items. Not until then can an accurate standard for an elementary electricity text be established. This would involve much more study and space than can be given to it in a preliminary report such as this. But until such time as that is done, the data given in Tables 1 and 2 will be found very helpful.

^{1/} Science, No. 83, Supplement 9, May 15, 1936.

^{2/} Flaherty, E.B., Industrial Art and Vocational Education, XXIII (March, 1934), p.132.

^{3/} Hodges, E.S., Electricity and Fire Risk.

^{4/} State Department of Education, Bulletin Number 19, New York City.

^{5/} Lauffer, Charles A., Resuscitation, p.90.

^{6/} Circular of Bureau of Standards, Number 397, United States Department of Commerce.

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The following table reveals data concerning the content other than subject matter of the fifteen books analyzed.

Table 3. Contents of Fifteen Books Analyzed for other than Subject Matter

Book	Number of Items	Pages of Appendix	Number of Figures	Number of Tables	Number of Questions	Number of Problems	Number of Sample Problems
A	105	3	542	28	451	137	160
B	78	6	468	7	-	870	42
C	96	-	437	16	501	347	38
D	70	-	548	28	-	-	185
E	39	9	157	-	597	-	-
F	95	14.5	666	20	627	551	141
G	47	3	262	7	-	600	51
H	77	3.5	218	7	117	139	78
I	42	-	253	3	-	-	23
J	49	-	203	3	-	-	-
K	68	-	113	2	6	-	5
L	47	5.5	145	2	-	-	-
M	72	-	207	10	219	129	51
N	49	10.5	130	4	180	54	13
O	60	-	233	5	-	37	15
Mean	65.17	3.8	304.5	9.4	169.5	216.5	56

Table 3. (Concluded)

Book	Number of Formulas	Number of Pages	Number of Symbols	Pages of Summary	Pages of Index	Pages of Content	Number of Chapters	Title of Author
A	165	694	-	-	11	5.5	34	Prof.Phy.
B	55	569	14	15	10	5.5	16	Prof.E.E.
C	72	597	-	29	11.5	1	23	Prof.Phy.
D	90	646	-	-	13.5	4	53	E.E.
E	-	226	-	4	4	8	18	Tchr.Sci.
F	173	850*	-	-	14	16	27	Prof.E.E.
G	20	306	15	13	7	3	10	Prof.E.E.
H	123	278	8	-	5.5	2.5	10	Prof.Phy.
I	5	248	7	-	3.5	1	10	Many Au.
J	1	209	-	-	2.75	2	16	Au.-E.E.
K	5	333	25	-	3	10.5	12	Tchr.Sci.
L	5	185	-	-	6	0.5	12	Au.-E.E.
M	20	235	-	-	2.5	3	12	Tchr.Phy.
N	14	258	-	-	4	0.75	12	Prof.Phy.
O	5	297	9	-	6.5	0.75	19	Prof.Sci.
Mean	57.5	377.4	5.8	4.0	7.3	4.0	17.2	
*2 Volumes								

DISCUSSION OF FINDINGS AS INDICATED IN TABLE 3

This table is important for several reasons, as indicated in the discussion that follows.

It gives the reader an approximate idea of the attention devoted to the mechanics of the average textbook and an insight into many important things in a text that do not show up in an analysis of subject matter. It also helps in determining to what extent problems, questions, summaries, etc. are being used to aid in teaching electricity.

Pages devoted to an index are important facts in a book, as is also the number of sample problems. A great many problems in a book without answers are of little value except to a teacher, and the same applies to questions. They are merely testing materials.

The wide diversity of opinions is as evident in this table as it was in the other two.

Particular attention should be paid to the use of space for figures. The reader will note the mean is 304.5 and the range 130 to 666. These figures may be divided into five classes: schematic drawings, curves, graphs, freehand drawings, and plain photographs of experimental apparatus, electrical machinery, and other electrical devices, as well as parts of these. Many of these depict obsolete equipment, and many others show nothing but external views. They vary from a picture of a frog's leg to one of Niagara Falls. The presence of many of these is due to the fact that the plates are furnished free by companies for advertising purposes.

Table 3 should be used in conjunction with Tables 1 and 2 when analyzing and evaluating a book.

SUMMARY

The writer's aim in this thesis has been to analyze and evaluate all elementary textbooks suitable for a study of elementary electricity ^{1/} and then to use these findings in order to set up a preliminary standard that will be of value in the selection of a suitable book on this subject.

Every student of electricity is aware of the fact that there is a lack

^{1/} See Appendix A, p.67.

of uniformity of opinion among authors of elementary textbooks, not only as to what subject matter should be included, but also as to what methods are best adapted for its presentation. Unless these students have made systematic studies, similar to this one, however, it is impossible for them to realize fully the extent of this disorganization.

The chief reasons for these conditions are that many authors are physics or science teachers, and as such they think of electricity from an historical or experimental point of view. Consequently the writing of a book results in more or less a repetition of material, without any attention to the social, economic, and industrial conditions governing the electrical industry. Textbook writers still think of electricity as a sub-division of the sciences, instead of as an important independent subject.

In Table 3, under the heading of "Title of Author" we find that the authors of fifteen elementary electricity texts may be classified as follows: professors or teachers of physics, five; professors or teachers of science, three; professors of electrical engineering, two; electrical engineers who are authors or inventors, two; practical electrical engineers, one; authors in collaboration, one.

When the above data are studied it is evident that in the selection of a text particular attention should be paid to the training, experience, and background of the author for the following reasons: (1) the electrical engineer is most liable to be too technical; (2) the author or lecturer caters to the interest of his readers; and (3) the practical man is sure to emphasize whatever his specialty is or has been.

The first step was to classify the subject matter of each book under

items as shown in Table 1. The order in which these items occurred in each book and the space devoted to them was noted and tabulated.

Each book was then checked to find chapters, problems, questions, summaries, etc. The mean of each of these was found and the results tabulated.^{1/}

Data recorded on these two tables formed a basis for the average against which anyone could check and evaluate an electricity book or course of study, provided he was satisfied to accept the opinions of the majority of the authors of such books.

In addition to this, however, it was realized that much valuable information is to be obtained from the writings of many learned men who are experts in their professions, and that in an analysis of this kind nothing must be overlooked.

With this in mind the writer selected at random from the tabulations a few items which, in his opinion, were over-emphasized, under-emphasized, or obsolete, and he obtained as much information as possible from all available sources to substantiate his contentions. In addition to the reading of more advanced texts, periodicals were studied, executives of companies were interviewed, pamphlets on items involved were procured from manufacturers, and at the same time professors, teachers of electricity, contractors, and electricians in the trade were consulted. The writer used the data obtained to test samples of the tabulated items, and he found that they did not correspond with the conclusions shown by the analysis of the texts. The attention of the reader is called to this discrepancy in order to impress on him the importance of checking each doubtful item for him-

^{1/} See Table 3, p.61-62.

1. The first part of the paper is devoted to a general discussion of the problem.

2. The second part is devoted to a detailed analysis of the case of a single particle.

3. The third part is devoted to a detailed analysis of the case of a system of particles.

4. The fourth part is devoted to a detailed analysis of the case of a system of particles.

5. The fifth part is devoted to a detailed analysis of the case of a system of particles.

6. The sixth part is devoted to a detailed analysis of the case of a system of particles.

7. The seventh part is devoted to a detailed analysis of the case of a system of particles.

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13. The thirteenth part is devoted to a detailed analysis of the case of a system of particles.

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22. The twenty-second part is devoted to a detailed analysis of the case of a system of particles.

23. The twenty-third part is devoted to a detailed analysis of the case of a system of particles.

24. The twenty-fourth part is devoted to a detailed analysis of the case of a system of particles.

25. The twenty-fifth part is devoted to a detailed analysis of the case of a system of particles.

26. The twenty-sixth part is devoted to a detailed analysis of the case of a system of particles.

self, and the folly of accepting the analysis of authors' statements without due thought.

This is only a preliminary study, and unless it stimulates research that will eventually create a valid standard, the objectives of the writer will not have been accomplished.

Much valuable information may be obtained when checking a book in the manner suggested in this study, even if Tables 1 and 3 alone are accepted as a standard, provided the reader will study carefully the range and mean of pages of each item, its relative position as given by each author, and the number of authors discussing it. This study should also be helpful as a guide when constructing or reconstructing a course of study.

It is the writer's sincere hope that this thesis may inspire some author in the field of electricity to write a text based on scientific analysis, careful research, and present demands which will meet the needs of the teacher and those interested in the study of electricity.

1. The first part of the document is a letter from the President of the United States to the Congress, dated 1793. It is a very important document, as it is the first time the President has addressed the Congress in person.

2. The second part of the document is a report from the Secretary of the Treasury, dated 1793. It is a very important document, as it is the first time the Secretary of the Treasury has reported to the Congress. The report discusses the state of the nation's finances, and the measures that have been taken to improve them. It also discusses the need for a new system of currency, and the steps that have been taken to create it.

3. The third part of the document is a report from the Secretary of the Navy, dated 1793. It is a very important document, as it is the first time the Secretary of the Navy has reported to the Congress. The report discusses the state of the Navy, and the measures that have been taken to improve it. It also discusses the need for a new system of naval organization, and the steps that have been taken to create it.

APPENDIX A

TEXTS ANALYZED IN THIS STUDY

- Book M - Burns, Elmer E., A Study of First Principles of Electricity, D. Van Nostrand Company, New York, 1930, ix; 235 p.
- Book L - Collins, A. Fredrick, Book of Electricity, D. Appleton-Century Company, New York, 1937, xiv; 185 p.
- Book D - Croft, Terrell, Practical Electricity (Second Edition), McGraw-Hill Book Company, New York, 1920, viii; 646 p.
- Book F - Dawes, Chester L., Industrial Electricity, Vols. I and II, McGraw-Hill Book Company, New York, 1925, xiv, 371; xv, 480 p.
- Book A - Hausmann, Erick, Swoops Lessons in Practical Electricity, (Seventeenth Edition), D. Van Nostrand Company, New York, 1927, xiii; 694 p.
- Book C - Jackson and Black, Elementary Electricity and Magnetism, (Revised Edition), The Macmillan Company, New York, 1926, vii; 598 p.
- Book N - Jones, E.W., Essentials of Applied Electricity (Revised Edition), Bruce Publishing Company, Milwaukee, 1935, 258 p.
- Book O - Lunt, Joseph R., Everyday Electricity, The Macmillan Company, New York, 1937, x; 297 p.
- Book E - Meister, Morris, Magnetism and Electricity, Charles Scribner's Sons, New York, 1935, v; 226 p.
- Book I - Millikan-Bishop, Elements of Electricity, American Technical Society, Chicago, Illinois, 1937, 248 p.
- Book J - Morgan, Alfred, A First Electricity Book for Boys, Charles Scribner's Sons, New York, 1936, xii; 209 p.
- Book H - Slack, Edgar P., Elementary Electricity, McGraw-Hill Book Company, New York, 1937, ix; 271 p.
- Book K - Small, Sidney A., Boys' Book of Electricity, H.P. Dutton Company, New York, 1931, 333 p.

Book B - Timbie, William H., Elements of Electricity (Third Edition), John Wiley and Sons, New York, 1937, x;569 p.

Book G - Timbie, William H., Essentials of Electricity (Second Edition), John Wiley and Sons, New York, 1935, xi;306 p.

APPENDIX B

SOURCES OF VALUABLE INFORMATION
USED IN THIS STUDY

1. Aerovox Research Worker, Aerovox Company, Brooklyn, N.Y.
2. American Institute of Electrical Engineers, New York City.
3. American Year Book, American Year Book Company, New York City.
4. Association of American Railroads, Engineering Division, New York City.
5. Babson Reports, College Section Division, Wellesley Hills, Mass.
6. Bell Laboratory Records, Bell Telephone Company, New York City.
7. Book Review Digest (1937-1938), H.W.Wilson Company, New York City.
8. Cumulative Book Index, H.W.Wilson Company, New York City.
9. United States Catalogue, H.W.Wilson Company, New York City.
10. Edison Electric Institute, New York City.
11. Educational Index, H.W.Wilson Company, New York City.
12. Edison Storage Battery Company, Orange, N.J.
13. Electric Merchandizing, McGraw-Hill Book Company, New York City.
14. Federal Power Commission, Washington, D.C.
15. General Electric Sales Promotion Division, Schenectady, N.Y.
16. Industrial Arts Index, H.W.Wilson Company, New York City.
17. List of Inspected Electrical Appliances for 1937, Underwriter's Laboratories, Chicago, Illinois.
18. List of Publications of the National Educational Association of the United States (October 10, 1937).

19. Periodical Directory, by Carolyn F. Ulrich, R.R.Bowker Company, New York City.
20. Reader's Guide to Periodical Literature, H.W.Wilson Company, New York City.
21. Standard Catalogue for High School Librarians, with Supplement, H.W. Wilson Company, New York City.
22. Superintendent of Documents, Washington, D.C.
23. Supplement to the 1937 List of Electrical Apparatus, Underwriter's Laboratories, Chicago, Illinois.
24. Technical Book Review Index, Special Library Association, New York City.
25. Supervision of Extension Courses, Industrial Relations Department, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pennsylvania.
26. World Almanac and Book Facts, New York World, New York City.

- 1. The first part of the paper is devoted to a general discussion of the problem.
- 2. In the second part, we consider the case of a single particle.
- 3. The third part is devoted to the case of a system of particles.
- 4. In the fourth part, we consider the case of a continuous medium.
- 5. The fifth part is devoted to the case of a system of continuous media.
- 6. In the sixth part, we consider the case of a system of particles and continuous media.
- 7. The seventh part is devoted to the case of a system of particles and continuous media.
- 8. In the eighth part, we consider the case of a system of particles and continuous media.
- 9. The ninth part is devoted to the case of a system of particles and continuous media.
- 10. In the tenth part, we consider the case of a system of particles and continuous media.

APPENDIX C
PERSONAL LETTERS

COPY

ASSOCIATION OF AMERICAN RAILROADS
 Operations and Maintenance Department
 Electrical Section
 59 East Van Buren Street
 Chicago

Officers of Section

J.M.Symes, Vice-President.
 Operations and Maintenance Department

H.F.Brown, Chairman
 D.B.Thompson, Vice-Chairman
 Walter S. Lacher, Secretary

New Haven, Conn.
 April 5, 1938

Mr. John Y. Murray,
 Rindge Technical School,
 Cambridge, Mass.

Dear Mr. Murray:

Your letter of March 28th to the American Railroad Association has been referred to me.

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..... There has been no major installation of third-rail since 1910, the trend being entirely toward an overhead contact system, and from the relative mileage you will note that, in spite of the three or four installations of 3000 volt direct current, the major trend seems to be in favor of the 11000 volt, single phase, alternating current, this having been adopted by the Pennsylvania Railroad for their entire electrification program. So much for the trend in this country. Abroad on the continent the trend in Sweden, Germany, Austria and Switzerland all seems to be in favor of the single phase, alternating current, high voltage system, whereas in England, France and to a limited extent in Italy the major electrifications are about

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NAVY
WASHINGTON, D. C.

1917

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NAVY DEPARTMENT
WASHINGTON, D. C.

1500 volt, direct current, the ruling factor being somewhat the type of power supply available. If you wish to follow up this subject further in detail, there is a very extensive bibliography on railway electrification on file in the American Transsit Association headquarters at 292 Madison Ave., New York, and there have also been numerous reports by the American Railway Association, the National Electric Light Association (now the Edison Electric Institute), and the report of the Chicago Smoke Commission in 1916 also deals extensively with this subject.

Referring to your second question as to what types of batteries are used in connection with rail bonds, I assume that you have in mind power supply track circuits for signaling. The modern trend in this connection seems to be toward a relatively low capacity power supply line (usually A.C.) from which are charged, by means of rectifiers, low voltage storage batteries which are "floating" on the line. Where power supply lines are not available, primary batteries are used and usually these are the so-called "gravity" type. To the best of my knowledge, dry batteries are very seldom used.

.....

Trusting this gives you the information you desire, I am

• Yours very truly,

(Signed) H.F.BROWN

Chairman

(Asst.Elec.Engr.,N.Y.N.H.& H.R.R.)

• • • • •

COPY

PHILADELPHIA ELECTRIC COMPANY
1000 Chestnut Street
Philadelphia

H.B. Bryans
Vice-President

March 29, 1938

Mr. John Y. Murray
Rindge Technical School
Cambridge, Mass.

Dear Mr. Murray:

In reply to your letter of March 28, the supply of direct current in Philadelphia was discontinued in October, 1935.

.....

If there is any other information you wish, please let me know.

Yours very truly,

(Signed) H.B. BRYANS

Vice President



GOVERNMENT OF INDIA
MINISTRY OF DEFENCE
OFFICE OF THE SECRETARY

SECRET

Reference: [illegible]

[illegible signature]

[illegible name]

[illegible text]

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[illegible text]

[illegible text]

[illegible text]

[illegible text]

COPY

BRYANT MANUFACTURING COMPANY

Manufacturers of Railway Signal Supplies
 Battery Zincs, Coppers, etc.
 Hard Vulcanized Fibre Tags & Specialties

New York Office
 Rooms 1501-2-3 Times Bldg.
 Tel. Bryant 3983-3984
 Long Distance 603

Factory: 456-466 W. Ontario Street
 Telephone Superior 4628
 Chicago

New Addresses

N.Y. Office: 246 - 5th Ave.
 Chicago Off: 401 N. Paulina St.
 Seeley 5482

Mr. John Y. Murray,
 Rindge Technical School,
 Cambridge, Mass.

March 24, 1938.

Dear Sir:

We have yours of the 22th inst. asking for a list of wet batteries and their chief use of each.

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The #3 Crowfoot Battery Zinc or 6 X 8 cell is the one most used by the telephone and telegraph companies. Can use #1-2-3-4-6-7-8 zinc with this battery. The #8 zinc is used mostly by railroads for signal work and fire alarm companies for fire alarm work. The railroads have changed over to the caustic soda (Edison) type battery in the last years, on account of less maintenance work, as the wet cell, gravity type has to have the right density in order to work properly, and needs more attention.

The #5- 5 X 7 Zinc can also be used for telephone and telegraph work but is not in such demand as the larger type.

The Cylinder type #14 and #15 zincs is used for door bell ringing, also the Pencil Zinc type #11-12-13-20-24-25-26 but is obsolete. This is the battery composed of Carbon, zinc, Sal Ammoniac and water.

The Telegraph companies are gradually getting away from the wet cell and are using a transformer to reduce or change their current to fit their instruments, in conjunction with a radio tube.

THE HISTORY OF THE

REIGN OF KING CHARLES THE FIRST

IN THE YEAR 1649

BY JOHN BURNET

OF THE UNIVERSITY OF OXFORD

1680

Printed by J. Streater

at the Sign of the Gun, in St. Dunstons Church-yard

near the North-Door

By Authority

Printed by J. Streater

at the Sign of the Gun, in St. Dunstons Church-yard

near the North-Door

1680

THE HISTORY OF THE REIGN OF KING CHARLES THE FIRST IN THE YEAR 1649

.....

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THE HISTORY OF THE REIGN OF KING CHARLES THE FIRST IN THE YEAR 1649

THE HISTORY OF THE REIGN OF KING CHARLES THE FIRST IN THE YEAR 1649

THE HISTORY OF THE REIGN OF KING CHARLES THE FIRST IN THE YEAR 1649

Trust this information will be of some value to you and should you desire more information will be glad to give same.

Yours very truly,

Bryant Manufacturing Co.

(Signed) H.BURKLAND

Manager.

HB-NS

Catalogue under separate cover.

COPY

EDISON ELECTRIC INSTITUTE
420 Lexington Avenue, New York

April 2nd 1938

Mr. John Y. Murray
Rindge Technical School
Cambridge, Mass.

Dear Sir:

In reply to yours of March 30, I am sending a copy of our last statistical bulletin which gives you an idea of the trend of the business.

.....

The importance of direct current in the public utility field is steadily growing less and, outside of certain chemical plants and in transportation, its use is restricted to the older sections of a few cities such as Boston and New York. About 3% of the energy in this country is generated as D C and perhaps 10% of the energy used is D C. The largest consumers are the trolley and subway lines which last year used some 6 billion kwhrs, with electrochemistry--notably the production of aluminum--taking perhaps 4 billion more.

The 3 phase-4 wire systems are becoming increasingly popular and there is a strong tendency not only to install them on new work but to change over the older 3 phase-3 wire delta systems to it. I cannot give you any definite figures and future work depends very largely on the revival of building construction and repair in this country.

.....

Yours very truly

(Signed) Wm. M. Carpenter

Wm. M. Carpenter
Economist

COPY

THE HOLTZER-CABOT ELECTRIC CO.

Executive Offices and Factory, 125 Amory St., Boston, Mass.

BOSTON

Cable-Holtzer-Boston
 A B C 6th Edition Code Used

In Reply Refer to AAC:AEM:#33
 April 7th, 1938.

Mr. John Y. Murray,
 Rindge Tech School,
 Electrical Department,
 Cambridge, Massachusetts.

Dear Sir:

I have your letter of March 31st requesting information on the operation of Intercommunicating Telephone System as used in apartments and houses. I will, as far as I am able, answer your questions in the order in which you have listed them in your letter.

- A. It is standard practice now to operate Intercommunicating Telephone Systems from rectifiers.
- B. Type of rectifier most commonly used is the copper oxide type.
- C. Following is an approximate proportion of the different types of sources of energy used for Intercommunicating Telephone Systems

Rectifier	15%
Dry Cells	20%
Storage Battery	60%
Primary Battery	5%

- D. In metropolitan district of Boston where direct current only is available, most of the systems are operated on dry cells and a few are operated on storage batteries charged by means of motor generator sets.

I trust that the above information is what you require, and if there is any further information we can give you, kindly let us know.

Yours very truly
 THE HOLTZER-CABOT ELECTRIC CO.
 (Signed) A.A.CHURCH
 N.E.Signal Sales Division

COPYHARVARD UNIVERSITY
GRADUATE SCHOOL OF ENGINEERINGChester L. Dawes
Associate Professor of Electrical EngineeringPierce Hall
Cambridge, Massachusetts

April 20, 1938

Mr. John Murray
Rindge Technical School
Cambridge, Mass.

Dear Mr. Murray:

I was delayed in answering your letter of April 13 since I was in New York the latter part of this last week. I have given considerable thought to your question as to the proportion of direct currents and alternating currents theory which should be given in an elementary course to students in High School. It is difficult to give exact proportions but fifty per cent of each will not be far out of the way. I would be inclined to favor fifty-five or sixty per cent direct current provided such subjects as capacitance, inductance and induced e.m.f. are given in the direct current work.

With solid training in these subjects as background, I have found that students pick up the alternating current theory quite rapidly. For example, with the generation of a direct current e.m.f. it is necessary to show the students that in a direct current generator coil an alternating current is generated and commutation must be used to obtain direct current. Thus the student assimilates the idea of alternating current sine wave, frequencies, etc. Also in a study of capacitance and inductance he learns that a current can flow into charge a condenser without passing through the dielectric and that inductance tends to prevent changing current.

If the student understands these factors well, together with similar ones, he should pick up alternating current rapidly.

It would be easier for me to give a more definite answer if I knew specifically the subjects which you take up and the order in which they are given. If a personal conference would be of any further assistance to you, I would be only too glad to sit down and talk the matter over with you.

Very truly yours,

CLD:M

(Signed) Chester L. Dawes

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
JANUARY 1954

RECEIVED
JAN 15 1954

TO THE DIRECTOR
OF THE UNIVERSITY OF CHICAGO
FROM THE DEPARTMENT OF CHEMISTRY
RE: [illegible]

[illegible text]

COPY

WILLARD STORAGE BATTERY COMPANY

Main Office and Factory
246-286 E. 131st St.
Cleveland, Ohio

Address your
Reply to

April 6, 1938.

Mr. John Y. Murray,
Rindge Technical School,
Cambridge, Mass.

Dear Sir:-

In response to your request of April 4th for some information on the Willard Low Discharge line of batteries I am forwarding to you, under separate cover, our Low Discharge battery folder which fully describes these batteries and illustrates several applications.

This is a comparatively new line and is being used quite extensively by the U.S. Government in marine service. Many installations are in use on highway flashers, train signals, fire alarms, etc.

.....

Very truly yours

WILLARD STORAGE BATTERY COMPANY

(Signed) H.E. EVANS
H.E. Evans

Sales Promotion Manager

HEE/AHP

THE HISTORY OF THE CITY OF BOSTON

BY
JOHN B. BOWEN

VOLUME I

PUBLISHED BY
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COPY

THE WESTERN UNION TELEGRAPH COMPANY
230 Congress Street
Boston, Mass.

J.H.Groves
Superintendent

April 1, 1938.

Mr. John Y. Murray,
Care Rindge Technical School,
Cambridge, Mass.

Dear Sir:

We have your letter of March 29, and are pleased to furnish you the following information:

We use motor generators. The motors are 3 phase A.C.-208 volts with standard motor generator benches and panels. They are used for 24 hour period. Our power supply is furnished by the Edison Electric Illuminating Company. Keys, sounders and relays are used on regulating sets in our test-room; also on a few Morse operated circuits. The majority of our business is now handled over multiplex and teleprinter machines and a small portion by Morse.

Any time it is convenient for you to call at our Main Office, I shall be pleased to have someone explain all of these details and show you the actual operation.

Very truly yours,

(Signed) J.H.GROVES

Superintendent

100

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COPY

THE WESTERN UNION TELEGRAPH COMPANY
230 Congress Street
Boston, Mass.

J.H.Groves
Superintendent

April 13, 1938.

Mr. John Y. Murray,
Rindge Technical School,
Cambridge, Mass.

Dear Sir:

I am glad to furnish the following information in answer to the queries raised in your letter of April 5,

In rural sections and in railroad offices we ordinarily use main line sounders which do not require local current. Where that is not possible because of the length of the circuit, or for any other reason, we use rectifiers, storage batteries or motor generators.

Although a good many railroads still use the Morse method of handling train dispatching and telegrams, some have adopted the use of telephone circuits as a substitute. In this part of the country the New York, New Haven and Hartford Railroad uses telephone circuits, the Boston & Maine and Boston and Albany use both Morse and telephone, the Maine Central and Bangor and Aroostook use Morse entirely.

Yours truly,

(Signed) J.H.GROVES

Superintendent

THE HISTORY OF THE CITY OF BOSTON FROM 1630 TO 1800

By J. O. SARGENT

Vol. II
1800-1850

Published by the
BOSTON PUBLIC LIBRARY

ASTOR LENOX AND TILDEN FOUNDATIONS
NEW YORK

1895

This volume contains the history of the city of Boston from 1800 to 1850. It is the second volume of a two-volume work. The first volume covers the period from 1630 to 1800.

The history of Boston from 1800 to 1850 is a period of great change and growth. The city was the center of the American Revolution and the birthplace of many of the great men of the nation. It was also the center of the abolition movement and the birthplace of many of the great reformers of the age.

The city of Boston was the center of the American Revolution and the birthplace of many of the great men of the nation. It was also the center of the abolition movement and the birthplace of many of the great reformers of the age. The city was the center of the American Revolution and the birthplace of many of the great men of the nation. It was also the center of the abolition movement and the birthplace of many of the great reformers of the age.

1800-1850

Published by the
BOSTON PUBLIC LIBRARY

ASTOR LENOX AND TILDEN FOUNDATIONS
NEW YORK

COPY

NEW ENGLAND POWER ASSOCIATION
441 Stuart Street
Boston, Massachusetts

April 11, 1938

Mr. John Y. Murray
Rindge Technical High School
Cambridge, Massachusetts

Dear Sir:

The name "New England Power Association" means the trustees for the time being (as trustees but not individually) under an agreement and declaration of trust dated January 2, 1926, as amended, which is hereby referred to, and a copy of which as amended has been filed with the Commissioner of Corporations and Taxation of the Commonwealth of Massachusetts. Any agreement, obligation or liability made, entered into or incurred by or in behalf of said association binds only the trust estate, and no shareholder, director, trustee, officer or agent thereof assumes or shall be held to any liability therefor.

Pursuant to your recent request we submit the following information:

Total kwh sold for the year ended December 31, 1937 by Subsidiaries of NEW ENGLAND POWER ASSOCIATION Consolidated was 1,971,331,997

It is estimated that of this amount 6,686,000 kwh was sold by Direct Current, which is approximately 0.3% of the total kwh sold.

All information herein is furnished solely for your statistical records. It is not and should not be taken to be a prospectus, notice, circular, advertisement, letter, communication or representation of any kind issued with reference to the sale of, offer of sale of, or solicitation of an offer to buy or sell any security or interest in any security now or hereafter issued.

Very truly yours

NEW ENGLAND POWER ASSOCIATION
(Signed) H. HANSON
TREASURER

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THE COMMONWEALTH OF MASSACHUSETTS
Department of Education
State House, Boston

April 6, 1938

Division of
Elementary & Secondary
Education & State Teachers
Colleges

Mr. John Y. Murray
Rindge Technical School
Cambridge, Massachusetts

My dear Mr. Murray:

The State Department of Education has no course of study in electricity for high schools for distribution.

.....

Very truly yours,

(Signed) A. RUSSELL MACK

Supervisor of Secondary Education

T/1

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COPY

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF EDUCATION
WASHINGTON

April 8, 1938.

Mr. John Y. Murray
Rindge Technical School
Cambridge, Mass.

Dear Sir:

You ask in your letter of recent date to suggest text books on electricity suitable for secondary school use. It is difficult to recommend text books particularly since there are so many good books in science which have sections devoted to electricity. Too, the field of electricity is so broad that any text book emphasizing a particular phase of electricity such as motors or dynamos would be apt to leave out considerable basic material necessary for well grounded training in this field.

.....

Very truly yours,

(Signed) G. A. Mc GARVEY

G.A.McGarvey
Agent
Industrial Education

COPY

STATE OF WISCONSIN
DEPARTMENT OF PUBLIC INSTRUCTION
MADISON

John Callahan
State Superintendent

April 13, 1938

J. F. Waddell
Asst. State Superinten-
dent

Mr. John Y. Murray
Rindge Technical School
Cambridge, Massachusetts

Dear Sir:

Your letter of April 6 has been referred to me for reply.

We do not have a uniform course in industrial arts for our state. The qualifications of a teacher of electrical work is quite generally three or four years of preparation, preferably four or more, in Wisconsin high schools and grades.

Yours very truly,

(Signed) A.R. PAGE

Supervisor of Secondary Schools

ARP:GEC

COPY

NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANY
750 Massachusetts Avenue
Cambridge A, Mass.

F.A.Shurtleff
Manager

Telephone
TROWbridge 9950

April 4, 1938

Mr. John Y. Murray, Instructor
Rindge Technical School
Cambridge, Mass.

Dear Mr. Murray:

Arrangements have been made, in accordance with your letter of March 31, to provide you with the information which you requested relative to the use of our storage batteries.

In the meantime, I would like to extend to you an invitation to visit our Central Office at 10 Ware Street, Cambridge where our Wire Chief, Mr. Kelley, will be glad to have the equipment used there explained to you in detail.

Yours very truly,

(Signed) F.A.SHURTLEFF

Manager

FAS:D

THE
JOURNAL OF THE
ROYAL ANTHROPOLOGICAL INSTITUTE

Volume 10

Part 1

1900

Published by the
Royal Anthropological Institute
of Great Britain and Ireland
21, BEDFORD SQUARE, LONDON, W.C.1

CONTENTS
The Journal of the Royal Anthropological Institute of Great Britain and Ireland, Volume 10, Part 1, 1900.
The Journal of the Royal Anthropological Institute of Great Britain and Ireland, Volume 10, Part 1, 1900.
The Journal of the Royal Anthropological Institute of Great Britain and Ireland, Volume 10, Part 1, 1900.

Editor
The Royal Anthropological Institute
of Great Britain and Ireland
21, BEDFORD SQUARE, LONDON, W.C.1

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WISCONSIN
 STATE BOARD OF VOCATIONAL EDUCATION

Geo. P. Hambrecht, Director
 1 West Wilson Street
 Madison, Wisconsin

April 4, 1938

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 Vice-President Peter T. Schoemann, Milwaukee
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 Jennie M. Turner, Asst. Teacher Training
 E.E.Gunn, Jr., Assistant Director

Mr. John Y. Murray
 Rindge Technical School
 Cambridge, Massachusetts

Dear Mr. Murray:

In Wisconsin the State Board of Vocational and Adult Education has no connection with the industrial arts or practical arts work carried on in the

high schools; that comes under the Department of Public Instruction. We do however have in the forty-four local schools of vocational and adult education throughout the state a number of departments of electricity. In addition there are two circuit teachers in this field who travel among a number of schools either supplying or supplementing the instruction in electricity.

We do not have any such thing as a uniform state course in electricity; the particular needs of the local groups in this field govern what is offered. All of the men handling this work are thoroughly competent from the trade standpoint with ample backgrounds of trade experience. Then they go forward with teacher training programs worked out individually; in service teacher training both on the job during the school year and in summer schools. Under separate cover you will find some bulletin material which you may find of interest. There is also a current directory of the personnel in the local schools. Mr. Anderson and Mr. Patterson, the circuit teachers in electricity, might have some material developed which you could use; I would suggest that you write them direct. Then by looking through the body of the directory you can see who is handling instruction in electricity in the various local schools.

Very truly yours,

(Signed) H.C.THAYER

Teacher Training Supervisor
Trade and Industrial Education

H.C.Thayer

MM

CC: Hambrecht, Gunn

1. The first part of the report deals with the general situation of the country and the progress of the work during the year. It is a summary of the work done by the various departments and a statement of the results achieved.

2. The second part of the report deals with the work done by the various departments during the year. It is a detailed account of the work done by each department and a statement of the results achieved. It is divided into sections dealing with the work of the various departments.

3. The third part of the report deals with the work done by the various departments during the year. It is a detailed account of the work done by each department and a statement of the results achieved. It is divided into sections dealing with the work of the various departments.

4. The fourth part of the report deals with the work done by the various departments during the year. It is a detailed account of the work done by each department and a statement of the results achieved. It is divided into sections dealing with the work of the various departments.

5. The fifth part of the report deals with the work done by the various departments during the year. It is a detailed account of the work done by each department and a statement of the results achieved. It is divided into sections dealing with the work of the various departments.

6. The sixth part of the report deals with the work done by the various departments during the year. It is a detailed account of the work done by each department and a statement of the results achieved. It is divided into sections dealing with the work of the various departments.

7. The seventh part of the report deals with the work done by the various departments during the year. It is a detailed account of the work done by each department and a statement of the results achieved. It is divided into sections dealing with the work of the various departments.

COPY

WETMORE-SAVAGE DIVISION

Boston, Mass.
 Springfield, Mass.
 Worcester, Mass.
 Providence, R.I.
 Burlington, Vt.
 Bangor, Maine
 Augusta, Maine

WESTINGHOUSE
 ELECTRIC
 SUPPLY CO.

76 Pearl Street, Boston

April 2, 1938

Subject

In Reply Refer to
 EVW/aem

Mr. John Y. Murray
 Rindge Tech. School
 Cambridge, Mass.

Dear Mr. Murray:

We have your note of the 31st regarding doorbells and batteries. The so-called wet cell has practically gone out of existence. A few of the telephone companies still use the old close-circuit type of cell using the copper and lead - but the regular wet cell is practically out of existence.

We still sell a few of the old zincs for batteries that are probably still in use; but practical everybody now-a-days in the AC territory, of course, use a bell ringing transformer and in the DC areas use ordinary dry cells.

Glad to hear from you once more.

Yours very truly

Wetmore-Savage Division
 Westinghouse E. S. Co.

(Signed) E. VAL WETMORE

m

MEMORANDUM

TO : THE PRESIDENT

FROM : THE SECRETARY

SUBJECT: [Illegible]

DATE: [Illegible]

[Illegible text in right margin]

[Illegible text]

[Illegible text]

[Illegible text]

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COPY

ELECTRICAL WORLD

McGraw-Hill Building
330 West 42nd Street
New York, N.Y.

April 12, 1938.

Mr. John Y. Murray
Rindge Technical School,
Cambridge, Mass.

Dear Sir:

The following are the best answers we can give to your inquiry of
April 5:

.....
.....
.....
.....
.....

There is no conflict between the study of d.c. and a.c. The former, being simpler, is advisable as an introduction to a.c., irrespective of the amount of use of either type of current in present-day practice.

Yours very truly,

(Signed) G.F.WITTIG

G.F.Wittig,
Statistical Editor.

EW-sjm

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CHAPTER I

THE first part of the book is devoted to a general survey of the subject. It begins with a definition of the term "philosophy" and then proceeds to a discussion of the various branches of the subject. The author then turns to a consideration of the history of philosophy, tracing its development from ancient times to the present. He then discusses the various methods of philosophy, including the deductive and inductive methods, and the importance of logic in philosophy. The book concludes with a chapter on the philosophy of language, in which the author discusses the relationship between language and thought, and the importance of semantics in philosophy.

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the first of these is the fact that the system is not a simple one, and that the results are not always the same.

The second of these is the fact that the system is not a simple one, and that the results are not always the same.

The third of these is the fact that the system is not a simple one, and that the results are not always the same.

The fourth of these is the fact that the system is not a simple one, and that the results are not always the same.

The fifth of these is the fact that the system is not a simple one, and that the results are not always the same.

The sixth of these is the fact that the system is not a simple one, and that the results are not always the same.

The seventh of these is the fact that the system is not a simple one, and that the results are not always the same.

The eighth of these is the fact that the system is not a simple one, and that the results are not always the same.

The ninth of these is the fact that the system is not a simple one, and that the results are not always the same.

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CHAPTER I

The first part of the book is devoted to a general survey of the subject. It begins with a definition of the term "philosophy" and then proceeds to a discussion of the various branches of the subject. The author then discusses the history of philosophy, from the ancient Greeks to the modern era. He then discusses the various methods of philosophy, such as logic, metaphysics, and ethics. The chapter concludes with a discussion of the importance of philosophy in the modern world.

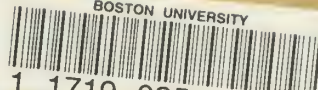
CHAPTER II

The second part of the book is devoted to a detailed discussion of the various branches of philosophy. It begins with a discussion of logic, which is the study of the principles of reasoning. The author then discusses metaphysics, which is the study of the nature of reality. He then discusses ethics, which is the study of the principles of morality. The chapter concludes with a discussion of the various schools of thought in philosophy, such as Platonism, Aristotelism, and Stoicism.

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